

d-Au Run History

C.J. Gardner

January 28, 2008

1 Mon 28 Jan

The 2008 d-Au run ended at 8:15 pm Sun 27 Jan.

APEX (with deuterons and gold ions) then ran until 8 am Mon 28 Jan.

2 Sun 27 Jan

During the day (as per Chris Naylor):

Physics ran for the majority of the shift with three stores. The first was inherited from the previous shift. The second store went up with a bit of a struggle as we had to reset an fec during the ramp. The third store went up very well and continues as of the end of the shift. An attempt to put up a store between the first and second one was thwarted by an fec problem during the ramp. pp development work took place behind the physics stores. BLIP ran all shift.

Ramp 9654 dAu82 (95 bunches per ring) started at 10:37 am.

1.329×10^{11} deuterons and 0.995×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.6%, Yellow ramp efficiency: 95.4%.

10:44 am. Beam Abort, 5e-ps2.A dropped Loss Monitor 1.

Ramp 9655 dAu82 (95 bunches per ring) started at 11:26 am.

1.347×10^{11} deuterons and 1.092×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.9%, Yellow ramp efficiency: 94.5%.

Ramp 9656 dAu82 (95 bunches per ring) started at 3:58 pm.

1.223×10^{11} deuterons and 1.056×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.8%, Yellow ramp efficiency: 95.4%.

Initial ZDC rates close to 190 kHz for Phenix.

During the evening and overnight (as per Jim Jamilkowski):

The 2008 d-Au run ended (at 8:15 pm Sun 27 Jan) after 1.15 hours of physics, and was followed by 10.12 hours of accelerator physics experiments.

AGS DC bump power supply H11C tripped twice tonight with a cooling fault and once on a crowbar fault.

Three Yellow ion pumps that were turned off for the Au77 experiment could not be turned back on afterwards. There appears to be a communication problem that is affecting all of the ion pumps controlled from 1008B. This should be investigated during the daytime. The vacuum coprocessor for 1004B.L is also in need of a reset.

3 Sat 26 Jan

During the day (as per Chris Naylor):

Physics ran for the majority of the shift with two stores. The first store lasted a full lifetime and the second continues in the machine. During most of the first store and all of the second PHENIX was unable to acquire any ZDC data as a result of a problem with their beam-beam counter.

PHENIX made a brief access at the end of the first store to repair the problem but to no avail. It turns out that the problem is with something other than the beam-beam counter. Arrangements have been made for PHENIX to make another access at the end of the current store to try to fix it. pp development took place for most of the shift. BLIP ran for the majority of the shift except for a short interruption due to an LTB reachback to the TANK-1 beam-stops. As of the end of the shift a prepare to dump has been issued to the experiments with preparations underway for a PHENIX access to repair an equipment problem.

Notes: The Load Fault indication for BLI.DV095.STAT on the pet page is false. The supply is on and operating correctly. This false indication should be investigated at the earliest convenience.

Ramp 9651 dAu82 (95 bunches per ring) started at 12:56 pm.

1.226×10^{11} deuterons and 1.015×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.8%, Yellow ramp efficiency: 95.1%.

During the evening and overnight (as per Nick Kling):

The shift began with an access into IR8 to repair a temperature sensor on the PHENIX beam-beam counter system. Once this repair work was completed physics ran for 9.20 hours over two stores. The latest of which remains in the machine as of shifts end. Polarized proton setup ran for 8.66 hours. BLIP ran for all 12 hours of the shift.

7:49 pm. Nick Kling: “With over 1.2/bunch of Deuteron beam the losses at b5-lm3.1 are not too bad. That slight orbit difference looks like it was the cause yesterdays problem. The only difference in Blue between the recent store and the failed ramp attempts were H and V correctors.”

Ramp 9652 dAu82 (95 bunches per ring) started at 9:14 pm.

1.215×10^{11} deuterons and 1.034×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.9%, Yellow ramp efficiency: 95.0%.

Initial ZDC rates close to 200 kHz for Phenix.

Ramp 9653 dAu82 (95 bunches per ring) started at 3:57 am Sun 27 Jan.

1.246×10^{11} deuterons and 1.061×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.2%, Yellow ramp efficiency: 95.2%.

Initial ZDC rates close to 180 kHz for Phenix.

4 Fri 25 Jan

During the day (as per Vincent Schoefer):

On this shift we had 1.5 hours of development for beam waist knobbing and injection drift correction and about 5 hours of physics during the early part of the shift. The latter part of the shift was spent trying to return to physics. One store lasted about an hour before large yellow beam losses caused a beam loss permit pull. The next two ramps failed due to fast blue beam losses shortly after cogging. As of the end of the shift, we are attempting another ramp.

12:25 pm. The experiments are ready to dump. M. Bai and N. Malitsky are performing IR waist knob development.

1:40 pm. W. Fisher, J. Morris and A. Marusic are developing injection drift correction.

1:56 pm. Filling for physics.

2:11 pm. The power supply for yo5-tq4 has tripped during the ramp, resulting in a loss monitor permit pull. G. Heppner is swapping out the current regulator card.

3:15 pm. Greg is done. We will resume injection for physics. He replaced the regulator card and the fiber optic card.

Ramp 9644 dAu82 (95 bunches per ring) started at 3:28 pm.

1.143×10^{11} deuterons and 0.998×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.3%, Yellow ramp efficiency: 95.1%.

4:48 pm. Already very high yellow beam decay took a fast step up about an hour into the store and pulled the loss monitor permit. The reason for the step up is not clear. There were no ramp activations for minutes before the abort.

Ramp 9645 dAu82 (95 bunches per ring) started at 5:27 pm.

1.109×10^{11} deuterons and 1.057×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.1%, Yellow ramp efficiency: 95.8%.

5:32 Beam Abort, 5e-ps2.A dropped Loss Monitor 1.

5:48 pm. John Morris: "I've disabled the DriftCorrection steps in the BackToInjection sequence. We'll reenble them when we make it all work during APEX."

Ramp 9646 dAu82 (95 bunches per ring) started at 6:20 pm.

1.110×10^{11} deuterons and 1.011×10^9 gold ions per bunch at injection.

6:26 pm. Beam Abort, 5e-ps2.A dropped Loss Monitor 1.

Ramp 9647 dAu82 (95 bunches per ring) started at 6:20 pm.

1.138×10^{11} deuterons and 1.001×10^9 gold ions per bunch at injection.

7:30 pm. Beam Abort, 5e-ps2.A dropped Loss Monitor 1.

During the evening and overnight (as per Nick Kling):

Physics ran for 7.30 hours on two successful RHIC ramps. The shift began with a continuation of the series of failed ramp attempts from the previous shift. We were able to overcome this problem of Loss Monitor interlocks occurring during the cogging process by reverting the ramp to an earlier file and by reducing the Blue beam intensity slightly. It is still unclear which of these changes fixed the problem but the answer can be known on

the next fill if we return the Blue intensity to the nominal values. The main source of downtime on this shift was caused by a failed power supply in the cryo PLC in the 10 o'clock region. Once this failure was recovered from RHIC ran smoothly for the remainder of the shift. Polarized proton setup ran for 4 hours of the shift. BLIP ran for all 12 hours.

7:36 pm. Nick Kling: "I have reverted the machine to the Pre-Apex awesome store."

Ramp 9648 dAu82 (95 bunches per ring) started at 8:11 pm.

1.108×10^{11} deuterons and 1.038×10^9 gold ions per bunch at injection.

8:21 Beam lost on ramp up. Dumping Beam and ramping down.

9:34 pm. Mei Bai: "Both 9646 and 9647 are aborted by b5-lm3.1. This seems to suggest that local orbit at IP6 in blue may not be optimized."

9:51 pm: Nick Kling: "I have reverted back to Wednesday morning's store. If it is orbit problem this should be taken care of. Did LISA possibly optimize incorrectly at the end of a store or when there was no beam?"

Ramp 9649 dAu82 (95 bunches per ring) started at 11:00 pm.

1.017×10^{11} deuterons and 0.997×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.2%, Yellow ramp efficiency: 95.7%.

Ramp 9650 dAu82 (95 bunches per ring) started at 5:31 am Sat 26 Jan.

1.053×10^{11} deuterons and 1.010×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.8%, Yellow ramp efficiency: 95.1%.

5 Thur 24 Jan

During the early morning (as per Nick Kling):

Physics ran for 7.13 hours on two RHIC stores. Polarized proton setup ran for the first 2.75 hours of the shift. BLIP ran for all 8 hours of the shift.

Ramp 9637 dAu82 (95 bunches per ring) started at 3:33 am.

1.142×10^{11} deuterons and 1.028×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.8%, Yellow ramp efficiency: 95.3%.

During the day (as per Vincent Schoefer):

This shift was largely spent performing RHIC beam development activities. The blue injection kicker timing was adjusted, collimation on

the ramp was tested during a hysteresis ramp and a study of the collisional component of yellow beam decay were completed. The development was impeded by a misconfiguration of the RHIC ring-to-ring synchro loop (after an AC reset of the associated FEC, cfe-4a-rfb3), which ultimately resulted in blue beam losses on the ramp and a subsequent magnet quench. We also experienced problems with lisa steering, probably stemming from communications problems with the RampManager. As of the end of the store we have re-established a physics store in RHIC and polarized proton development continues in the AGS.

Notes to operations: Collimation on the ramp has been added to the Up sequence but is skipped by default. To enable ramp collimation, enable the step shortly after accramp labeled 'Ramp Collimation' and skip the 'Collimators to Standby' step. Trips of AGS RF station K while mode switching (should they occur) should be addressed by sending a zero function to the cavity and compensating with voltage on the remaining cavities. D. Goldberg will address any problems tomorrow.

9:55 am to 10:35 am: Mei, Nikolay, and Vadim test IR waist moving knobs.

10:45 am. Beam dumped and RHIC ramped down. Carl Schultheiss begins work on yellow main dipole feedback.

Ramp 9640 dAu82 (95 bunches per ring) started at 3:33 pm.

1.081×10^{11} deuterons and 1.025×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.1%, Yellow ramp efficiency: 95.7%.

During this store, blue beam was moved out of collisions so that yellow decay rate could be measured under this condition. Vernier scans were then done at IP8 and IP6.

During the evening and overnight (as per Jim Jamilkowski):

Physics ran for 10.3 hours between three stores, the first of which was extended due to problems involving the Booster C3 inflector and Booster A3 RF station. AGS pp setup work continued behind the RHIC stores. BLIP ran all shift.

AGS RF station K does not stay on when mode switching to gold from pp and has remained off since the last mode switch.

Ramp 9641 dAu82 (95 bunches per ring) started at 11:45 pm.

1.169×10^{11} deuterons and 1.046×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.2%, Yellow ramp efficiency: 95.0%.

Initial ZDC rates close to 175 kHz for Phenix.

Ramp 9642 dAu82 (95 bunches per ring) started at 6:38 am Fri 25 Jan.

1.150×10^{11} deuterons and 0.994×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.2%, Yellow ramp efficiency: 95.9%.

6 Wed 23 Jan

During the early morning (as per Nick Kling):

Physics ran for 5.68 hours. After a slight delay waiting for the STAR detectors to ramp down, APEX ran for the remainder of the shift. BLIP ran for all 8 hours of the shift.

Ramp 9627 dAu82 (95 bunches per ring) started at 12:15 am.

1.170×10^{11} deuterons and 1.031×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.3%, Yellow ramp efficiency: 96.3%.

Initial ZDC rates close to 175 kHz for Phenix.

During the day (as per Vincent Schoefer):

APEX ran for the entire shift. BLIP was interrupted briefly to effect a swap of a Mod 2 quad card.

Note to operations: D. Gassner has a standing request for a RHIC access to investigate the recent problems inserting the yellow stochastic cooling tank 3 kicker in the event that there is an existing failure that is expected to last several hours. Operations should contact M. Sivertz in the event that this should happen.

During the afternoon and evening (as per Jim Jamilkowski):

APEX came to an end after 3 hours, and was followed by an access to cycle the low voltage for the Muon Telescope Detector and revive one of the FMS signals at STAR. The first store afterwards was lost after a minute due to a b4-q89 trip. After power supply testing yielded no further trips, another store was put up that remains in the machine as of the end of the shift. Physics ran for 2.3 hours. Collimators were successfully used during the RHIC ramp once this evening. AGS on-the-fly pp injection setup resumed after A. Zelenski came in and cleared an ECR HV cage trip. BLIP ran all shift.

Eight false Blue power supply state mismatch alarms have not cleared. A

reset of cfe-6b-ps3 was attempted.

Notes to Operations: Use the ModeSwitchMaster tape to switch in and out of protons. See the OpsWiki for detailed instructions. Now that the pp source is being used, monitor it using the Oppis-logger GPM. All signals should stay level. Watch alarms have been set up for a portion of the source parameters.

Ramp 9634 dAu82 (95 bunches per ring) started at 5:58 pm.

1.140×10^{11} deuterons and 1.040×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.8%, Yellow ramp efficiency: 94.7%.

Store lost at 6:07 pm. QLI in blue ring due to b4-q89 trip. As per Greg Marr: “B4-q89-ps caused the beam permit to trip which then caused the 4b-qd1 quench detector to trip the blue link.”

Ramp 9636 dAu82 (95 bunches per ring) started at 8:34 pm.

1.099×10^{11} deuterons and 1.060×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.9%, Yellow ramp efficiency: 95.0%.

7 Tue 22 Jan

During the early morning (as per Nick Kling):

Physics ran for 5.73 hours on two physics stores. The first store, was lost 1.5 hours prematurely by a PASS interlock caused by the loss of the A division of the sector 10 sweep inputs. After the 10 o'clock zones were re-swept we lost the ensuing ramp attempt due to a loss monitor interlock as the beams were cogging. This was followed by a successful physics ramp that remains in the machine as of the end of the shift. Polarized proton setup progressed through the first 3 hours of the shift. BLIP ran for all 8 hours of the shift.

Ramp 9621 dAu82 (95 bunches per ring) started at 4:23 am.

1.152×10^{11} deuterons and 0.978×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.2%, Yellow ramp efficiency: 94.5%.

Beam aborted due to losses at cogging.

Ramp 9622 dAu82 (95 bunches per ring) started at 5:14 am.

1.169×10^{11} deuterons and 0.896×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.1%, Yellow ramp efficiency: 95.3%.

During the day (as per Vincent Schoefer):

Physics was interrupted on this shift by a failure of a limit switch for the yellow h2 collimator which caused the scraper to insert far past its ordinary store position and abort the yellow beam. The L10 RF cavity in the AGS was repaired behind the first store of the shift. As of the end of the shift, instrumentation personnel are accessing the RHIC ring to repair the yellow collimator limit switch.

During the afternoon and evening (as per Jim Jamilkowski):

Physics ran for 5.03 hours with the current store. J. Saetta and D. Lehn finished up a RHIC tunnel access after having cleared a Yellow h2 collimator limit switch problem. The ensuing store attempt was aborted due to beam losses around the time of cogging. In response, the store stepstone settings were reverted to those from Friday morning (fill 9599). So far, the changes appear to have been successful. K.L. Zeno and F. Severino worked on setting up the AGS on-the-fly injection for pp behind the RHIC store. BLIP ran all shift.

Yellow stochastic cooling kicker tank 3 left failed to insert for this evening's store.

Device read errors have occurred intermittently so far today for the following chipmunks: NM022, 32, 43, 49, 63, 76, 77, 82, 150, 152, 158, 210, and 213.

Notes to Operations: IR steering optimization has been enabled by default in the Down tape sequence. If pp beam will not be used in the injectors for an appreciable period of time, ask CAS to enable the beam to HEBT by setting up LINAC user 5 so that the source will continue to pulse.

Ramp 9626 dAu82 (95 bunches per ring) started at 5:49 pm.

1.210×10^{11} deuterons and 0.981×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.7%, Yellow ramp efficiency: 96.0%.

Initial ZDC rates close to 135 kHz for Phenix.

8 Mon 21 Jan

During the day (as per Vincent Schoefer):

Most of this shift was spent recovering injector efficiency behind a RHIC

store. Booster efficiency was recovered largely by restoring RF loop settings from early yesterday. Booster to AGS transfer efficiency was restored by work on the BtA synchro setup. The problem stemmed from a low signal amplitude in the BtA deltaFy synthesizer. The first store of the shift was aborted near the end of its nominal lifetime by a power dip, which interrupted the program for about an hour. As of the end of the shift a physics store continues in RHIC.

Ramp 9617 dAu82 (95 bunches per ring) started at 1:43 pm.

1.172×10^{11} deuterons and 1.059×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 96.0%, Yellow ramp efficiency: 78.5%.

Here the poor yellow efficiency was due poor longitudinal matching at RHIC injection (due to operator error).

During the afternoon and evening (as per Jim Jamilkowski):

Physics ran for 6.38 hours between two stores. One attempt failed due to fast beam losses at transition. The subsequent store attempt failed due to beam losses at the stochastic cooling insert time of the store. The third try was the charm. BLIP ran all shift. AGS pp setup continued behind the first store.

AGS RF station D is on but does not pulse on AU4. In response, the function has been zeroed out on that user.

Ramp 9620 dAu82 (95 bunches per ring) started at 10:35 pm.

Data not available. (Someone stopped BeamIons.logreq at 9:21 pm.)

9 Sun 20 Jan

During the day (as per Brian van Kuik):

Physics ran for 9.5 hours this shift between two stores with 2.5 hours of Machine Setup to refill RHIC. The first store, which was inherited from the previous shift, was extended by the experimenters for two additional hours. Afterwards the store was dumped, but there were difficulties tuning the injectors to provide decent beam for a RHIC fill. A couple mode switches between deuterons and gold and the injectors gave good beam to refill RHIC. As of the end of shift, Physics continues to run.

Polarized Proton work ran under the RHIC stores. An access into the AGS Ring to manually toggle a limit switch for the C15 polarimeter to allow

one axis to return to its home position. Once there, the other axis was able to be moved its home position.

BLIP ran all shift.

Ramp 9614 dAu82 (95 bunches per ring) started at 2:47 pm.

1.134×10^{11} deuterons and 1.118×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.7%, Yellow ramp efficiency: 95.5%.

Initial ZDC rates close to 160 kHz for Phenix.

During the evening and overnight (as per Nick Kling):

RHIC physics ran smoothly for 10.58 hours over three stores. Behind these stores there was a constant struggle to get the Booster and AGS even close to the level of performance expected for filling RHIC. There are two Rf problems that are known sources of the poor performance. The L10 cavity on the Deuteron cycle is dropping out every few cycles causing poor bunch merge and “baby bunches” in the AGS. There is also a sporadic problem with Booster to AGS syncro that cripples the gold setup while it is happening. While these problems are known and will require some serious attention today, they are likely not the only problems in the injectors as the setups for both species are in very bad shape at all parts of the cycle. BLIP ran for 10.88 hours. The program was off for just over an hour when an incorrect setting was loaded while diagnosing an intermittent problem with the BLIP beam.

Ramp 9615 dAu82 (95 bunches per ring) started at 11:07 pm.

1.050×10^{11} deuterons and 0.786×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 90.1%, Yellow ramp efficiency: 95.5%.

Initial ZDC rates close to 110 kHz for Phenix.

Ramp 9616 dAu82 (95 bunches per ring) started at 5:40 am Mon 21 Jan.

1.125×10^{11} deuterons and 0.981×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.8%, Yellow ramp efficiency: 95.3%.

Initial ZDC rates close to 153 kHz for Phenix.

10 Sat 19 Jan

During the day (as per Brian van Kuik):

Physics ran for 6.5 hours this shift in a store that began on the previous shift. The store was extended several hours while RF Personnel worked to repair the AGS L-10 RF Station. The AGS L-10 RF Station was finally working after the Filtering Power Supply for the Station's controls and the Bridge Amplifier circuits were rebuilt. When the store was finally dumped, Tandem encountered communication problems with the TTB Trim power supplies associated with the HITL3 House. Communication with the Trim power supply rack in HITL3 was restored after the IEEE Communications board was replaced for the rack.

An attempt to put up a store was made, but failed when a blue quench link interlock (QLI) occurred when RHIC was at flattop. With no obvious problems, the Blue ring was recovered and a hysteresis ramp was performed. Again the blue ring QLI-ed and it was noticed that the bo11-qd3 power supply might be a problem. D. Bruno was contacted and he confirmed that the bo11-qd3 power supply had a problem. As of the end of shift, D. Bruno is instructing CAS to swap out cards for the bo11-qd3 power supply.

During the failures that prevented refilling RHIC for another Physics store and other failure, K. Zeno was able to work with polarized protons. By the end of shift, he has protons circulating in the AGS at injection energy.

During the evening and overnight (as per Chris Naylor):

Majority of the shift was spent recovering from a power supply problem out at RHIC. Power supply personnel along with CAS had to replace a quadrupole supply in bldg 1012. RF personnel came in to look into a suspected problem with the Booster that delayed us from establishing sufficient intensity to fill with Au beam. Controls personnel had to be contacted to start two RHIC managers and we struggled to maintain stable Au intensity at input into the Booster. Work was done with polarized protons in the Booster and the AGS. BLIP ran all shift. A 95x95 bunch store was put up for Physics that continues as of the end of the shift.

Ramp 9613 dAu82 (95 bunches per ring) started at 4:08 am Sun 20 Jan.

1.154×10^{11} deuterons and 1.025×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.4%, Yellow ramp efficiency: 94.8%.

Initial ZDC rates close to 145 kHz for Phenix.

11 Fri 18 Jan

During the day (as per Jim Jamilkowski):

Physics ran for 5.23 hours in a store from the previous shift. After a break for PHENIX and STAR IR accesses and RHIC storage RF station X2 troubleshooting, three store attempts failed shortly after rebucketing. The first and third were aborted by Yellow beam losses that likely were caused by automatic orbit corrections, though this was not the understanding after the first time. On the first and second attempts, significant Blue beam debunching occurred at rebucketing due to voltage jumps on RF stations BS1 and X2. Both stations have been locked out in response to the problem, which resulted in minimal debunching at rebucketing on the latest store attempt. As of the end of the shift, the store stepstone orbit corrector settings have been reverted to the initial settings from the last good physics ramp. BLIP ran for 11.49 hours.

Polarized protons have not yet been injected into the Booster. O. Gould, D. Raparia, and A. Zelenski have found that the LINAC solenoid timing is not stable. B. Briscoe will be in in the morning to troubleshoot the problem.

Note to Operations: D. Beavis has requested that EBIS chipmunk data be dumped in the log for any period where proton beam is being set up in LTB.

6:58 am. Wolfram: “Put the Yellow octupoles back to -12 m^{-3} (from -10 m^{-3}), at transition.”

2:35 pm. Greg Marr: “Ramp orbit correction prompt should work properly now. Please keep an eye on it for the next few refills.”

Ramp 9601 dAu82 (95 bunches per ring) started at 2:30 pm.

1.214×10^{11} deuterons and 0.990×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.4%, Yellow ramp efficiency: 94.0%.

Debunching seen in blue at rebucketing. Beam abort at 2:40 pm.

Ramp 9603 dAu82 (95 bunches per ring) started at 4:28 pm.

1.144×10^{11} deuterons and 0.983×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.3%, Yellow ramp efficiency: 94.1%.

Beam abort at 4:36 pm. Jim Jamilkowski: “Blue debunching caused large losses and eventually a NM312 chipmunk interlock caused a beam abort.”

Wolfram: “Blue beam losses increase after rebucketing while the collimator positions do not change.”

Thomas: “This ramp also showed a hick-up in BS1 voltage although smaller than in the last ramp.”

5:21 pm. John Butler has locked out BS1 and X2.

Ramp 9605 dAu82 (95 bunches per ring) started at 6:32 pm.

1.146×10^{11} deuterons and 1.000×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.4%, Yellow ramp efficiency: 95.4%.

Beam abort at 6:42 pm.

During the evening and overnight (as per Chris Naylor):

The shift was marred by a series of problems that prevented us from putting up a store until well into the shift. However we were finally able to put up a store that continues in the machine. The major problem that prevented the last several stores from surviving the ramp was the stochastic cooler. The problem has been resolved by the system expert and CAS and the system should be ready for use on the next store. BLIP was off for a little more than a half-hour due to an RF Quad problem. As of the end of the shift RF personnel are in to work on a problem with the AGS RF.

Ramp 9606 dAu82 (95 bunches per ring) started at 8:08 pm.

1.229×10^{11} deuterons and 0.996×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.5%, Yellow ramp efficiency: 95.4%.

Beam aborted at 6:18 pm.

9:02 pm Yellow Store Chroms: Hor from 1.4 to 3.4, Vert from 0.6 to 2.6, as per Thomas.

9:21 pm Greg Marr: Barring any other candidates, +2 units of chrom is the best bet to fight instability.

I see 3 choices:

1. 6 bunch ramp.
2. 95 bunch ramp with the chromaticity changes.
3. 95 bunch ramp with the chrom changes, but skip collimation, stochastic cooling and auto orbit correction, then add them in one at a time manually to rule them out for sure.

9:41 pm. Greg: “I would delay the store BTF step also, as this too has been executing right around the abort time (according to device set history).”

9:43 pm. Thomas: “I agree that we should try the third option. I suspect that the vertical chrom was too small - the artus spectrum shows an awfully narrow peak and the vertical coherence shows a hint of an increase just before the abort. The instability would be a coupled-bunch weak head-tail instability that would show up with small or negative chrom.”

Ramp 9607 dAu82 (95 bunches per ring) started at 2:14 am Sat 19 Jan.

1.202×10^{11} deuterons and 0.906×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 97.0%, Yellow ramp efficiency: 96.4%.

Initial ZDC rates close to 160 kHz for Phenix.

2:32 am. Paul Menga: “Early evidence points to SC as the problem. When this started to spike, all the kickers were in and the pickups were about 90% of the way in. I had the application up, and as soon as I saw the yellow decay spike, I hit ‘Stop’ and then ‘Home’. Don’t think we’ll put the kickers back in tonight.... We were following Greg’s plan in the last elog. Nothing else (Coll, Orbit Correction, BTF) had been done yet.”

6:10 am. Brennan: “Mia Culpa! I caused the problem with the stochastic cooling pickup. During the Friday morning store I adjusted the pickup to improve the transverse signal output, but I forgot to take out the adjustment after the store. This must have caused the beam to hit one of plates when they were inserted after that. I had CAS go to 1012 and correct the problem so things should be back to normal for the next store, so cooling can be used. What can I say? I screwed up.”

12 Thur 17 Jan

During the early morning (as per Chris Naylor):

Physics ran for 5.15hrs this shift with two stores. The first was inherited from the previous shift which lasted a full lifetime and the second continues in the machine as of the end of the shift. BLIP was off all shift due to LINAC maintenance. It took a considerable amount of time to put up the second store because of input and efficiency problems with the TTB line and the Booster.

Ramp 9593 dAu82 (95 bunches per ring) started at 5:28 am.

1.234×10^{11} deuterons and 1.133×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.1%, Yellow ramp efficiency: 92.7%.

During the day (as per Jim Jamilkowski):

Physics ran for 6.83 hours between two stores. The second was delayed in order to switch from the ailing primary database server to the backup, and to allow PHENIX and STAR experimenter accesses. Rebucketing on the latest ramp was sub-optimal, resulting in higher than normal amounts of debunched beam. BLIP ran for 7.33 hours.

Both the Booster and ATR Radiation Safety Checklists have been completed. RS-LOTO has been removed from the LTB beamstops.

Since the database server was restarted, the “background levels” dropdown list has been unavailable in BERT. An attempt to restart the server was unsuccessful at clearing the problem. Also, automatic messages from BERT have so far not appeared in the RHIC elog.

Ramp 9595 dAu82 (95 bunches per ring) started at 4:53 pm.

1.112×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.8%, Yellow ramp efficiency: 92.9%.

During the evening and overnight (as per Nick Kling):

Physics ran for 9.68 hours over three physics stores. The first store was extended for 1.66 hours due to problems with the stability of the Gold beam from Tandem. The ensuing ramp attempt was lost due to loss monitor interlock that was the result of ramping with the X2 storage cavity damper out. Once we were recovered from this failed attempt another store was put up but had less than optimal collision rates presumably from debunching caused by continuing problems with the RHIC X2 cavity. Because of the lower than normal collision rates this store was dumped after only three hours and new store was put up and remains in the machine as of shifts end. Attempts were made to inject polarized protons on this shift though little if any progress was made on this front. BLIP ran for all 12 hours of the shift.

Ramp 9598 dAu82 (95 bunches per ring) started at 2:20 am Fri 18 Jan.

1.101×10^{11} deuterons and 1.217×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.4%, Yellow ramp efficiency: 94.4%.

Wolfram: “9598 has an instability, and low rates. We had reduced the octupole strength from -12 to -10 m^{-3} for this ramp.”

Ramp 9599 dAu82 (95 bunches per ring) started at 6:06 am Fri 18 Jan.

1.082×10^{11} deuterons and 1.208×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.4%, Yellow ramp efficiency: 90.9%.

Wolfram: “Also instabiliy on 9599 and low rates. Octupoles are still at -10 m^{-3} .”

13 Wed 16 Jan

During the early morning (as per Chris Naylor):

Accelerator Physics ran in RHIC for the whole shift except for an interruption of about 15mins due to orbit corrector power supplies that tripped in the Booster. As of the end of the shift Accelerator Physics continues in RHIC while preparations for the day’s maintenance have begun for the Booster and AGS. BLIP was off all shift for LINAC maintenance.

4:28 am. Natalia: “Next ramp I am going to try the quad damper in Yellow. I closed the loop and corrected the gain for the Yellow cavities. I think the phase is right, hope it all goes fine!”

4:53 am. Natalia: “Damper is working!! The gain could be higher however it damps the signal very nicely! Comparison of the measured longitudinal oscillations with and without the longitudinal quadrupole damper.”

During the day (as per Jim Jamilkowski):

After APEX ran for its final hour, scheduled maintenance activities began. As of the end of the shift, the Booster access is complete and the AGS is being swept for beam.

A Change Control Form has been completed for the AGS Radiation Safety Checklist. A new ATR RSC checklist for protons is available in the MCR.

During the afternoon and evening (as per Nick Kling):

Scheduled maintenance progressed for the first 5.5 hours of the shift. After a 6x6 bunch test ramp, a physics store was ramped and remains in the machine as of shifts end. BLIP remained off for maintenance throughout the shift.

7:23 pm. Greg Marr: “After discussing the situation with Paul and Fulvia, I made the sequencer files for transision as pictured: Blue leaps to 95kV and Yellow doesn’t leap at all. The Yellow longitudinal damping is

supposed to be set to go but as far as I know we have no way of verifying that in MCR. I left a message for Natalia regarding this, I couldn't reach her directly."

8:08 pm. Greg Marr: "I talked to Natalia, turns out she was still out at 1004. According to her the A0, A1, triggers on the pet page RHC/Rf/LowLevel/Timing/V102BeamCtlTrigs turn the damper on and off, respectively. To disable it, trigger A1 and then remove events on A0 and A1. This info is also in MCR's required reading."

Yellow longitudinal quadrupole damper active for this ramp.

Step up to 95 kV in blue at transition for this ramp.

Ramp 9591 dAu82 (95 bunches per ring) started at 8:40 pm.

1.162×10^{11} deuterons and 0.998×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.0%, Yellow ramp efficiency: 94.2%.

14 Tue 15 Jan

During the early morning (as per Chris Naylor):

Physics ran for 7.23hrs this shift with one store. There was a brief interruption during the ramp of the store due to a problem with the bpms in the blue ring. As of the end of the shift there is a ramp underway with 93 bunches in each ring. BLIP was turned off earlier this morning in preparation for maintenance later today.

Ramp 9576 dAu82 (93 bunches per ring) started at 11:57 pm Mon 14 Jan.

1.120×10^{11} deuterons and 0.968×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.1%, Yellow ramp efficiency: 95.0%.

Ramp 9577 dAu82 (93 bunches per ring) started at 6:53 am.

1.128×10^{11} deuterons and 1.029×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.7%, Yellow ramp efficiency: 94.7%.

During the day (as per Jim Jamilkowski):

RHIC physics ran for 6 hours between two stores. The fill pattern has been increased to 95 bunches per Ring in order to increase the number of colliding bunches for STAR. Quad mode damping circuitry has been installed for the Yellow RF but has not yet been activated. M. Blaskiewicz has implemented an RF voltage change during the ramp at transition for

Yellow.

10:18 am. Wolfram: “Created a new pattern 95x95 with 4 more collisions for STAR (and 2 more for PHENIX). Please use for the next ramp.”

11:28 am. Blaskiewicz: “I have modified the RF files at transition for yellow. The voltage on ya1 and ya2 steps from 75 kV to 95 kV over 1 millisecond when the rf jumps phase, 10 seconds after gammat-start.”

Number of bunches increased from 93 to 95.

Ramp 9578 dAu82 (95 bunches per ring) started at 1:52 pm.

1.134×10^{11} deuterons and 1.030×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.8%, Yellow ramp efficiency: 93.8%.

2:22 pm. Mikes, Natalia, John, Mei: “The feedback loop for the bunch length oscillations has been inserted. We see no adverse effects. Also, the voltage jump at transition reduced the bunch length oscillations after transition. The multi-bunch average (available only in 1004) shows that the average amplitude of these oscillations is half what it was.”

During the afternoon and evening (as per Nick Kling):

Physics ran for the first 6 hours of the shift. After a 30 minute delay waiting for PHENIX to ramp down their detectors, APEX ran for the remainder of the shift. BLIP was off for the entire shift for maintenance.

15 Mon 14 Jan

During the day (as per Jim Jamilkowski):

Physics ran for 5.3 hours between two stores. Problems with retracting the Yellow stochastic cooling kicker tank 3 left caused delays in filling for the second store. A decision will be made this afternoon on whether the kicker tank should be repaired or disabled in the retracted position (with the necessary changes to tape and/or manager).

Ramp 9574 dAu82 (93 bunches per ring) started at 10:06 am.

1.061×10^{11} deuterons and 1.114×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.9%, Yellow ramp efficiency: 93.5%.

10:21 am. Wenge: “The SC kicker tank 3 left didn’t inserted. This has been happening since Sunday.”

10:24 am. Wolfram: “Could you check orbit and steering? This store has

unusually low rates with only a hint of a Yellow instability.”

10:26 am. Wolfram: “A small signal of a horizontal instability, horizontally only. The BTM picture for this ramp would be interesting.”

10:40 am. Vadim: “Dependence of the Yellow transition transmission on bunch position on last ramp has unusual positive slope.”

11:10 am. Wolfram: “That could due to the e-cloud induced tune shift along the bunch train. Since the electron cloud is focusing, we should raise the Yellow tunes at transition by 0.0005 to get the tunes of the later bunches.”

13:42 am. “After discussion with Vadim, increased Yellow tunes (horizontal and vertical) at transition (gammat4 and gammat5) by 0.0005 for the next ramp.”

During the afternoon and evening (as per Nick Kling):

Physics ran for 7.67 hours on two stores. Between these stores was a 30 minute access to inspect Stochastic Cooling kicker 3 and for STAR TPC repairs. BLIP ran for all 9 hours of the shift.

2:42 pm. Christoph: “IR8 10 Hz signals look nice and clean. I’ll turn on the feedback to see whether it has any (hopefully positive!) effect on beam decay or backgrounds.”

2:47 pm. Christoph: “Turning on IR feedback in IR8 suppresses 10 Hz very nicely, but results in a low-frequency (about 1.5Hz) offset.”

4:32 pm. Thomas: “Turning the 10 Hz feedback on at 14:45 and back off at 14:51. 10 Hz signal gets reduced substantially but not a lower frequency. The lower frequency is probably a beat frequency. It seems to me that the feedback should work all the way to DC although there is too much drift in the DX BPMs for that. But much less than 1 Hz should be possible.”

Ramp 9575 dAu82 (93 bunches per ring) started at 5:27 pm.

1.063×10^{11} deuterons and 0.971×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.5%, Yellow ramp efficiency: 94.9%.

5:47 pm. Wolfram: “No position dependent loss along the bunch train any more in Yellow, keep the tune changes.”

5:50 pm. Wolfram: “Reverted Yellow chromaticity changes at transition from this morning since last two stores had larger emittance (statistics is low, admittedly).”

16 Sun 13 Jan

During the day (as per Travis Shrey):

Physics ran for 9.7 hours this shift over 3 stores. The first store was put up and was similar in performance to the early morning store with high initial decay rates; it was dumped after 4 hours. The second was a reversion to yesterday's midday store and nominal performance was restored. The third was just put up at the end of the shift and continues in the machine. There is an ongoing problem with the left kicker tanker 3 not inserting. W Fu has investigated; messages have been left with K Unger. BLIP ran all shift.

5:47 pm Sat 12 Jan. Wolfram: "For the next ramp, increased both Yellow chromaticities in gammat5 by 0.5 to work on these annoying Yellow instabilities. This may be too small to see something, but the ramps now are generally good, too good to make large changes." According to Travis, these changes were put in between ramps 9569 and 9570.

Ramp 9570 dAu82 (93 bunches per ring) started at 7:33 am.

1.098×10^{11} deuterons and 1.047×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.9%, Yellow ramp efficiency: 93.7%.

10:09 am. Thomas: "Yes, the noise (in blue) is back for this store. A little late this weekend."

10:59 am. Vadim: "Store orbit corrections at the beginning of the store have not been done for last 3 days. Identified reason is that the tape script 'autoCorrectRhicOrbit.pl' has to be modified in order to correctly call a new version of RhicLiveOrbitCorrector. Can not do it from home. Coming in to fix the problem."

11:00 am. Travis: "V. Ptitsyn found an error in a script for automatic orbit correction at flattop, possibly explaining the last few bad stores. He is coming in. We've informed the experimenters that we will be keeping the current store until the problem is fixed."

11:49 am. Vadim: "Updated both autoCorrectRhicOrbit.pl and autoCorrectRhicOrbitVert.pl scripts, which are responsible for the orbit corrections at the beginning and at the course of the store correspondingly. So, the correction should work now."

Ramp 9571 dAu82 (93 bunches per ring) started at 12:25 pm.

1.166×10^{11} deuterons and 0.991×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.1%, Yellow ramp efficiency: 95.5%.

4:37 pm. Thomas: “Coherence before (left) and after (right) the 0.5 chrom increase in γ_5 of yellow. This change should have moved the chrom zero crossing earlier, which might be true. Note that the following ramp with the same chrom setting didn’t have an instability although it had a lower intensity. To move the zero crossing to before transition chrom need to be increased by several units.”

5:02 pm. Christoph: “I’m not sure by how many units we can increase the chromaticity in γ_5 until the slope across transition becomes too large for the sextupoles. We should be able to raise chromaticities in γ_4 and γ_5 simultaneously without running into an instability before transition. This has typically twice (assuming that chromaticities are symmetric around zero across transition) the effect on the zero crossing time per unit chromaticity than raising it in γ_5 alone, plus we don’t run into power supply (voltage) limits.”

Ramp 9572 dAu82 (93 bunches per ring) started at 6:55 pm.

1.199×10^{11} deuterons and 0.982×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.4%, Yellow ramp efficiency: 95.7%.

7:12 pm. Wenge: “The SC kicker tank 3 left was not inserted, it didn’t move and stay at ‘Slip Detected’ status even it is at home. I believe there is a hardware problem with the SC kicker 3 left. Please contact David Gassner to look into this if the SC system doesn’t function right. All other SC pickups/kickers are fine.”

10:13 pm. Naylor: “D. Gassner called back about the Stochastic Kicker Tank 3 Left. Informed Dave that Kicker Tank 3 Left did indeed go all the way in for the current store.”

During the evening and overnight (as per Chris Naylor):

Physics ran for 10.33hrs this shift with two stores. The first was put up at the end of the previous shift but no collisions were seen until almost an hour after the ramp was complete as a result of a problem with the RHIC NotIf server and a problem with the network. The store did last a full lifetime. The second went up without any problem and continues as of the end of the shift. BLIP ran all shift.

Ramp 9573 dAu82 (93 bunches per ring) started at 2:23 am Mon 14 Jan.

1.155×10^{11} deuterons and 0.989×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.2%, Yellow ramp efficiency: 94.8%.

17 Sat 12 Jan

During the day (as per Travis Shrey):

Physics ran for 10.6 hours this shift over 3 stores. The first was inherited from the previous shift and was found to have non-functional gap cleaning (Kip asks: do you mean stochastic cooling?); vernier scans in blue for IR6 and 8 were performed at the end. P. Harvey and M. Brennan worked with CAS over the phone to get the yellow stochastic cooling system on in the middle of the second store. After six hours that store was dumped, another was put up and continues in the machine. BLIP ran all shift. From the previous shift: There were two critical device inhibits issued from the PASS 1000P permit system this morning at 02:16:06 and 02:16:41 that cleared within seconds. The trips are recorded on the AGS security PC since the RHIC critical device keyswitch was in AGS mode.

Ramp 9566 dAu82 (93 bunches per ring) started at 10:47 am.

1.130×10^{11} deuterons and 1.067×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 96.1%, Yellow ramp efficiency: 95.2%.

Phenix ZDC at 170 kHz after rebucketing. But stochastic cooling not yet back on.

11:47 am. Peggy: “CAS replaced a blown fuse, Freddy resolved issues logging into the network analyzer and Mike reset things up from home. Stochastic cooling should be back in business.”

11:53 am. Brennan: “The blown fuse was the AC line fuse in the power supply that supplies DC to the 1 x 16 Fan-out and to the ZRON amps in the equalizers. The delays had to be manually tweaked because the tracking loop (by the Network Analyzer) was not operating while the fuse was blown.”

Ramp 9567 dAu82 (93 bunches per ring) started at 5:23 pm.

1.213×10^{11} deuterons and 0.999×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.9%, Yellow ramp efficiency: 95.7%.

During the evening and overnight (as per Brian van Kuik):

Physics ran for 10.4 hours with 1 hour of Machine setup to refill RHIC. There was 0.6 hours of downtime with the Yellow ring quench link linterlocked. The cause was found to be a bad handoff between the flat current and the ramping current power supplies for the Yellow main

dipole. As of the end of shift, Physics continues to run. BLIP ran all shift.

Ramp 9569 dAu82 (93 bunches per ring) started at 1:06 am Sun 13 Jan.

1.087×10^{11} deuterons and 0.973×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.4%, Yellow ramp efficiency: 94.3%.

1:22 am Sun 13 Jan. Paul Menga: “Yellow beam decay shot up when things were inserted...see next entry.”

1:32 am Sun 13 Jan. Brain van Kuik: “There was a large vertical angle in Phenix yellow. The yellow beam entering was coming in at -6mm and leaving at $+6\text{mm}$ vertically. Blue was coming in around $+2\text{mm}$ and leaving around -2mm . Straightening them out a bit helped to decrease beam decay and increase Phenix ZDCs.

6:18 am Sun 13 Jan. Wolfram: “The orbit correction at the beginning of the store was supposed to deal with this. Did something go wrong?”

18 Fri 11 Jan

During the day (as per Nick Kling):

Physics ran for 10.07 hours over three physics stores. The first store was inherited from the previous shift and was extended for about an hour due to weather and several planned studies with the beam at store. The ensuing store began as one of the best ever but unfortunately an abort kicker pre-fire took it down after only 26 minutes in the machine. This was followed a quality physics store that remains in the machine as of shifts end. Behind this latest store was an access into the Booster to acid flush one of the coils on the BTA DH2-3 magnet. Concurrent with this access was power supply testing of polarized proton power supplies in the AGS. After this access was completed the remainder of the shift was spent working on the Gold bunch merge in the AGS.

BLIP ran for 11.17 hours. The downtime was due to a sparking problem in LINAC mod 3. This problem was tuned around for now but will require extended downtime next week to repair.

11:09 am. Brennan, Blaskiewicz and Marr experiment before dumping store 9560: “We reduced the storage voltage to $1/2$. The bunch length got longer, which implies that the momentum spread decreased but there was no change to the Yellow decay rate. One cavity tripped off when we tried to go to 100 kV.”

We return to the original bunch pattern.

Yellow store-stone setpoints put back to $Q_H = 31.2488$ and $Q_V = 32.3700$. (Recent history has shown that these are good tune setpoints. See Todd's elog entry 11:31 am Mon 7 Jan.)

Ramp 9561 dAu82 (93 bunches per ring) started at 11:45 am.

1.067×10^{11} deuterons and 0.980×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 96.1%, Yellow ramp efficiency: 97.2%.

Possibly one of the best stores so far, but it was brought down by a blue abort kicker pre-fire at 12:09 pm.

Ramp 9562 dAu82 (93 bunches per ring) started at 1:16 pm.

1.066×10^{11} deuterons and 1.007×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.1%, Yellow ramp efficiency: 96.9%.

1:18 pm Wolfram: "Yellow still unstable."

1:35 pm. Wolfram: For the next ramp one more step with the Yellow octupoles (step of -1 m^{-3} to setting -11 m^{-3}).

7:36 pm. Artus tune measurement done at end of store 9562.

During the evening and overnight (as per Brian van Kuik):

Physics ran for 10.5 hours this shift with 1.5 hours of Machine Setup.

During the Physics stores in RHIC, K. Zeno worked on injecting Gold 31+ into the AGS. He had approximately 100ms of Gold 31+ circulating in the AGS. K. Zeno has left details in the Booster-AGS-dAu-2008 eLog 74.

BLIP ran all shift with intermittent sparking on Linac Mod 3. CAS had difficulties minimizing the sparking on the Mod. V. Lodestro came in and lowered the beam current going to BLIP by 50 us. He also left instructions to turn off Linac and for CAS to secure Linac Mod 3 if the Mod should start sparking again.

Ramp 9563 dAu82 (93 bunches per ring) started at 8:29 pm.

1.082×10^{11} deuterons and 1.013×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 96.0%, Yellow ramp efficiency: 96.7%.

9:07 pm. Wolfram: "For the next ramp, one more step with the Yellow octupoles (by -1 to -12 m^{-3})."

10:22 pm. Ian notices a "kink" in the yellow decay rate. This was later found to be due to stochastic cooling going off.

Ramp 9564 dAu82 (93 bunches per ring) started at 3:19 am Sat 12 Jan.

1.138×10^{11} deuterons and 1.048×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.5%, Yellow ramp efficiency: 95.4%.

5:20 am Sat 12 Jan. Ian:

“Yellow beam decay will not come down. Is there an SC problem? We have no alarms, but things don’t look quite right.” (No satellite bunches seen on yellow WCM.)

19 Thur 10 Jan

During the early morning (as per Brian van Kuik):

Physics ran for 4.3 hours this shift in a store that began on the previous shift. Another store was attempted, but failed during the beta squeeze due to a beam loss monitor pulling the beam permit. This beam loss caused a magnet in sector 11 to quench and the blue quench link to go down. After Cryo gave us the okay to begin recovery and during recovery the BTA QH8 power supply tripped on a load fault. As of the end of shift, preparations have been made to access the AGS ring for the BTA QH8 magnet. The load fault for the magnet is unable to be cleared from outside the ring. BLIP ran all shift.

Ramp 9554 dAu82 (93 bunches per ring) started at 4:09 am.

1.273×10^{11} deuterons and 0.944×10^9 gold ions per bunch at injection.

This ramp used a modified “fancy gap” bunch pattern.

Ramp aborted due to what was later found (by John Butler) to be a problem with the blue Landau cavity.

During the day (as per Nick Kling):

Physics ran for 5.58 hours of two 93x93 RHIC stores. The first 4.25 hours of the shift were spent repairing the BTA QH8 cooling problems from the previous shift. There were also two problems with the high level Rf systems of AGS and RHIC that delayed the start of physics production on this store. Once all of these problems were resolved a store was put up but only remained in the machine for 45 minutes before it was taken down by a loss monitor interlock. The cause of this interlock is not definitively known but was most likely caused by an instability in the Yellow beam. After waiting the required one hour for the BLAM alarms from this loss to clear

a new store was set up. This store remains in the machine as of shifts end. Behind this most recent store there was approximately 1.5 hours of polarized proton power supply testing and checkout and 2 hours of development for the Gold +31 setup in the AGS. BLIP ran for 11.73 hours with 0.27 hours of downtime for a target change.

Ramp 9557 dAu82 (93 bunches per ring) started at 11:42 am.

1.078×10^{11} deuterons and 0.997×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 96.0%, Yellow ramp efficiency: 96.8%.

This ramp used a modified “fancy gap” bunch pattern.

Beam Abort at 12:35 pm. Loss monitor pulled permit. (Inadvertent insertion of yellow stochastic cooling pickup??)

1:00 pm. Wolfram: “Increased Yellow octupole strength by another 0.5 m^{-3} for next ramp (we still had an instability, but ramp transmission is good).”

1:03 pm. Horizontal and vertical yellow Chromaticities raised by 0.5 at store stone (as per Todd’s suggestion).

Ramp 9558 dAu82 (93 bunches per ring) started at 2:00 pm.

1.017×10^{11} deuterons and 1.002×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.8%, Yellow ramp efficiency: 96.1%.

This ramp used a modified “fancy gap” bunch pattern.

4:16 pm. Vadim and Dejan find evidence of electron cloud.

5:27 pm. Wolfram: “Yellow still unstable at transition, and ramp transmission still good. Increased octupole strength by another 0.5 m^{-3} (to -9 m^{-3}) for the next ramp.”

During the evening and overnight (as per Chris Naylor):

Physics ran for 10.08hrs with three stores. The first was inherited from the previous shift which was dumped on time; the second lasted a full lifetime; the third continues as of the end of the shift. There was an interruption between the first and second store because of a communication problem with the PostMortem server that effected blam accounting. There was also an interruption along the ramp of the third store due to a power supply fec problem which put wfg’s in a bad state. BLIP ran all shift.

Ramp 9559 dAu82 (93 bunches per ring) started at 8:57 pm.

1.108×10^{11} deuterons and 0.998×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.4%, Yellow ramp efficiency: 96.0%.

This ramp used a modified “fancy gap” bunch pattern.

10:56 pm. Wolfram: “One more step increase of the Yellow octupoles, by -1 m^{-3} to -10 m^{-3} .”

Ramp 9560 dAu82 (93 bunches per ring) started at 3:46 am Fri 11 Jan.

1.055×10^{11} deuterons and 1.012×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.8%, Yellow ramp efficiency: 95.8%.

This ramp used a modified “fancy gap” bunch pattern.

4:51 am. Naylor: “Nudged the yellow horizontal tune up by 0.0005 and the yellow horizontal chromaticity up by 0.5 in an effort to keep the beam decay from creeping upward. Nudged the yellow vertical chromaticity down by 0.5 as well; it was 0.6, now it’s 0.1.”

20 Wed 9 Jan

During the early morning (as per Brian van Kuik):

Physics ran for 5.2 hours this shift with 0.8 hours of Machine Setup. Accelerator Physics Experiments were to begin at 0500 hours, but at 0505 hrs problems with the Booster C7 Injection Bump. As of the end of shift, problems with the C7 Injection Bump power supply regulation is still broken. CAS and Pulsed Power personnel are working to repair the power supply. BLIP ran all shift.

Ramp 9549 dAu82 (93 bunches per ring) started at 1:10 am.

1.130×10^{11} deuterons and 1.025×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.7%, Yellow ramp efficiency: 95.0%.

This ramp used a modified “fancy gap” bunch pattern.

1:13 am. Wolfram: “Yellow still unstable (after octupole change) at transition, this time in both planes.”

During the day (as per Nick Kling):

APEX ran for 4.75 hours of the shift. The first 1.5 hours of the shift were spent continuing the diagnosis and repair of the Booster C7 injection bump that delayed the start of APEX on the previous shift. It was determined that this device was not working due to a malfunctioning regulator card. The spare card for this system turned out to be even worse

than the card that was in the device originally. While this spare card is being repaired the malfunctioning regulator card was moved from C7 to the C3 injection bump. The C3 bump is running at a lower current than C7 and the fault condition has less of an effect on the injected beam. BLIP ran for all 7 hours of the shift.

During the afternoon and evening (as per Chris Naylor):

Physics ran for 1.78hrs with one store that continues in the machine as of the end of the shift. APEX ran for most of the shift. There were accesses after APEX for the experiments and power supply work which lasted a little more than an hour. BLIP ran all shift.

Ramp 9553 dAu82 (93 bunches per ring) started at 8:31 pm.

1.105×10^{11} deuterons and 0.892×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.8%, Yellow ramp efficiency: 97.9%.

This ramp used a modified “fancy gap” bunch pattern.

10:48 pm. Wolfram: “Both Blue and Yellow had again instabilities at transition on the last ramp. Less intensity, fewer bunches, or more octupole strength could lead to higher luminosity.”

11:10 pm. Wolfram: “Since ramp transition is still very good, increased octupole strength in both rings by another 0.5 m^{-3} (to -7.5 m^{-3} in Blue, and -8 m^{-3} in Yellow).”

21 Tue 8 Jan

During the early morning (as per Brian van Kuik):

Physics ran for 6.8 hours this shift with 1.1 hours of Machine Setup. There was a 10 min access for Star Experimenters to restore control over their TPC, between the two stores on this shift. The first store began on the previous shift. As of the end of shift, Physics continues to run. BLIP ran all shift.

Ramp 9546 dAu82 (93 bunches per ring) started at 3:55 am.

1.127×10^{11} deuterons and 0.924×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.2%, Yellow ramp efficiency: 97.3%.

This ramp used a modified “fancy gap” bunch pattern.

The initial ZDC rates were nearly 160 kHz, possibly the highest seen so far

this run.

During the day (as per Nick Kling):

Physics ran for 5.20 hours on two physics stores. There was an hour of downtime between stores for STAR TPC VME repairs. BLIP ran for all 7 hours of the shift.

Ramp 9547 dAu82 (93 bunches per ring) started at 11:40 am.

1.126×10^{11} deuterons and 1.035×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.4%, Yellow ramp efficiency: 95.1%.

This ramp used a modified “fancy gap” bunch pattern.

Thomas notes: “Large emittance growth at transition in this store.”

Todd notes: “No clear loss pattern along the bunch train for this ramp, though yellow bunch losses through transition varied a bit more than blue.”

Todd again: “There is a real -10mm vertical bump at $s=3558\text{m}$ in blue that should be taken out at the end of the store. The correctors here are stressed, and moving the BPM at this location to a reading of zero would change those correctors to near zero strengths. The automatic vertical correction uses BestCorrectors and therefore cannot remove local bumps like this. Removing this local bump will likely necessitate modest tune and coupling adjustments.”

“There is also a 5mm bump at $s=483\text{m}$ in horizontal blue that could be taken out to reduce large local corrector strengths. A horizontal bump removal will change the tune a small bit but should not change coupling.”

During the evening (as per Chris Naylor):

Physics ran for 8.22hrs this shift with two stores. The first was inherited from the previous shift which lasted a full lifetime. The second continues in the machine as of the end of the shift. BLIP ran all shift.

Notes: Please see the 15:30 entry in the Booster-AGS-dAu-2008-Mon-Jan-7-2008-16:06:06-PM elog regarding the allowance of injecting the Au beam into the AGS without extracting to the W-dump.

Ramp 9548 dAu82 (93 bunches per ring) started at 6:09 pm.

1.063×10^{11} deuterons and 1.008×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.1%, Yellow ramp efficiency: 96.6%.

This ramp used a modified “fancy gap” bunch pattern.

11:37 pm. Wolfram: “Increased the Yellow octupole strength by a small amount (from -7 to -7.5 m^{-3}) in an attempt to suppress the transition instability completely on the next ramp.”

22 Mon 7 Jan

During the day (as per Nick Kling):

RHIC physics ran for 5.75 hours on one store. BLIP ran 6.77 hours.

Ramp 9539 dAu82 (93 bunches per ring) started at 8:07 am.

1.128×10^{11} deuterons and 1.273×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.9%, Yellow ramp efficiency: 92.1%.

10:15 am. Wolfram: “Last ramp showed instability in Yellow at transition. Increased the Yellow octupole strength at transition from -6 to -7 . This is the same as in Blue, and we had successfully ramped through transition with this during APEX (even with 111 bunches).

11:31 am. Todd: “Tune settings in yellow for dAu82 through the run. The waist scans from last week’s APEX are clearly visible, as are other scans later in the run. Also visible is a lowering of the yellow vertical tune in fill 9523 to combat high beam decay. This weekend we reverted to a later store, so we should probably **revert to tune settings of $Q_H = 31.2488$, $Q_V = 32.3700$ for the next ramp.** These are the tune settings for good early ramps, such as fill 9506.”

During the afternoon and evening (as per Chris Naylor):

Physics ran for 2.72hrs this shift with two stores, one that was inherited from the previous shift and one that continues as of the end of the shift. Four attempts at ramps failed as a result of a suspected instability at transition in the blue ring. For each attempt the per bunch intensity at injection was reduced. The fifth attempt finally succeeded when the per bunch intensity was reduced to a point where the beams survived throughout the ramp in both rings. BLIP ran all shift.

Ramp 9545 dAu82 (93 bunches per ring) started at 8:23 pm.

0.968×10^{11} deuterons and 0.841×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.6%, Yellow ramp efficiency: 96.3%.

23 Sun 6 Jan

During the day (as per Vincent Schoefer):

The first two stores of this shift were used primarily to improve the yellow beam lifetime at store. As of the end of the shift, a third store continues in the ring with acceptable luminosity lifetime. The PHENIX central inner magnet tripped once on this shift.

Ramp 9533 dAu82 (87 bunches per ring) started at 6:53 am.

1.319×10^{11} deuterons and 1.182×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.4%, Yellow ramp efficiency: 95.3%.

Ramp 9534 dAu82 (87 bunches per ring) started at 10:12 am.

1.400×10^{11} deuterons and 1.158×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.8%, Yellow ramp efficiency: 92.8%.

Ramp 9535 dAu82 (87 bunches per ring) started at 2:17 pm.

1.394×10^{11} deuterons and 1.144×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.2%, Yellow ramp efficiency: 94.8%.

During the evening and overnight (as per Brian van Kuik):

Physics ran for 7.5 hours this shift between two stores, the first of which began on the previous shift. At the store that was put up on this shift, a vernier scan was done for both the Star and Phenix IRs using the yellow beam. Afterwards a second attempt at putting up another store on this shift failed during the beta squeeze portion of the ramp. The ramp failed when beam quenched the B5QFQ2 magnet. As of the end of shift, quench recovery for the blue ring has begun. The cause of the blue magnet quench is still unknown.

BLIP ran for 11.6 hours this shift. The downtime for BLIP was caused when the Quad 9 High Voltage Power supply (HVPS) needed to have an 8 amp fuse replaced by CAS.

Ramp 9536 dAu82 (93 bunches per ring) started at 9:14 pm.

1.329×10^{11} deuterons and 1.133×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.8%, Yellow ramp efficiency: 93.6%.

24 Sat 5 Jan

During the day (as per Vincent Schoefer):

Physics ran for approximately 8 hours this shift in two stores. Between the two stores an access was made into the PHENIX IR to replace a mainframe for their MuID high voltage. Recovery from the access was delayed by a Ross relay switch problem in the anode supply of RHIC RF cavity YA1. As of the end of the shift a physics store continues in RHIC.

Ramp 9528 dAu82 (93 bunches per ring) started at 7:08 am.

1.272×10^{11} deuterons and 1.097×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.4%, Yellow ramp efficiency: 94.0%.

Betatron tune sidebands are again present in the blue vertical low frequency Schottky spectrum. Thomas suggests small changes in blue vertical tune as this has helped with the noise in the past. This was tried but did not help.

10:26 am. As per Vincent: “The Blue decay drops suddenly, and the sidebands have disappeared without MCR doing anything.”

This store (9528) was dumped at 1:22 pm.

Ramp 9529 dAu82 (93 bunches per ring) started at 5:06 pm.

1.284×10^{11} deuterons and 1.147×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.0%, Yellow ramp efficiency: 91.4%.

This store was dumped at 10:12 pm (one hour early because of low ZDC rates).

During the evening and overnight (as per Travis Shrey):

Physics ran for 3.5 hours this shift over one store that was inherited from the previous shift and was dumped 1 hour early because of low ZDC rates. During the fill for the following store the booster F3 kicker stopped pulsing. Experts came in and replace one of the charging resistors. The store that followed had high beam decay; MCR elected to attempt to place the tunes into the orientation described in the Plan of the Day. Doing so resulted in extremely high loss rates. That store was dumped to prevent BLAM alarms and the tunes were restored to the earlier settings. Another fill followed and was interrupted by a power dip that took out several systems. After a prolonged recovery of the STAR magnet power supply systems another store was put up that suffered from a blue debunch event

shortly after flattop. High losses quickly pulled the permit link and the debunched beam cause a blue ring quench. As of the end of the shift preparations are underway for an 87 bunch fill. BLIP ran all shift. Over the last several days there have been a large number of spurious events that come out of the 1000P PASS system that interlock the RHIC critical devices. If the critical device keyswitch is set to X and Y the arcs and switching magnet trip on a security fault; if the keyswitch is set to AGS the booster beamstops close. When in the AGS mode the security PC shows an interlock issued from the 1000P PASS system that clears in less than a second. ACS personnel should investigate this on monday.

Ramp 9530 dAu82 (93 bunches per ring) started at 1:50 am Sun 6 Jan.

1.256×10^{11} deuterons and 1.147×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.1%, Yellow ramp efficiency: 90.4%.

This store was dumped at 2:25 am (Sun 6 Jan) due to high loss rate.

3:01 am Sun 6 Jan. Power dip.

Ramp 9532 dAu82 (93 bunches per ring) started at 5:23 am Sun 6 Jan.

1.324×10^{11} deuterons and 1.192×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.9%, Yellow ramp efficiency: 94.7%.

5:36 am Sun 6 Jan. As per Travis: “Another spontaneous debunching in blue, this one wasn’t total. High losses quickly pulled the permit link and the debunched beam cause a blue ring quench.”

25 Fri 4 Jan

During the day (as per Chris Naylor):

Physics ran for 8.33hrs this shift with two stores. The first was inherited from the previous shift and was extended until after the 09:00 meeting. The second continues in the machine. As of the end of the shift, a prepare to dump has been issued to the experiments. STAR had to make an access between the stores to recycle a chiller system and to replace an electronics board. BLIP ran all shift.

Notes:

Auto steering has been removed from the Up sequence. (see the 10:14 entry in the rhic-dau 2008 - Fri Jan 4 2008 8:11:43 AM elog).

See the elog entry regarding vernier scans over the weekend. (see the 14:39 entry in the rhic-dau 2008 - Fri Jan 4 2008 8:11:43 AM elog).

Adjustments were made to the Bend Trim at gammat4 and gammat5 stones. The yellow tunes at those stones were adjusted to compensate. (see the 09:48 and 17:18 entries in the rhic-dau 2008 - Fri Jan 4 2008 8:11:43 AM elog).

The LF Schottky application is running at acnmcr1s. Please do not close this application.

Vadium (10:04 am): "Bend trim was increased by $1e-06$ in gammat4, gammat5 stones. Yellow tunes in those two stones were adjusted to compensate for small tune change due to bend trim adjustment and to get the tunes to those on ramp 9504 with 97% ramp transmission."

Ramp 9523 dAu82 (87 bunches per ring) started at 12:54 pm.

1.102×10^{11} deuterons and 1.248×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.5%, Yellow ramp efficiency: 93.3%.

During the evening and overnight (as per Travis Shrey):

Physics ran for 5.7 hours this shift over two stores. The first store was inherited from the previous shift and dumped after a normal lifetime. The second lived out a normal lifetime with a delay in the start of physics to determine new blue collimator positions. Between the two there were two failed attempts; the first was pulled by loss monitors as the blue collimators went into position. The second was lost when an RF glitch caused total debunching of the blue beam at flattop. Cleaning out the machine was partially successful; when the blue gap cleaner was turned on the loss monitors pulled the permit link and a blue quench ensued. As of the end of the shift the rings are filled and ramping. BLIP ran all shift. NOTE TO OPERATIONS: Do NOT make angle adjustments in the PHENIX IR without consulting A Drees.

Ramp 9524 dAu82 (87 bunches per ring) started at 9:20 pm.

1.249×10^{11} deuterons and 1.232×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.1%, Yellow ramp efficiency: 93.2%.

Permit pulled by loss monitors as the blue collimators went into position.

Ramp 9525 dAu82 (93 bunches per ring) started at 9:55 pm.

1.244×10^{11} deuterons and 1.183×10^9 gold ions per bunch at injection.

Lost when an RF glitch caused total debunching of the blue beam at

flattop.

Ramp 9527 dAu82 (93 bunches per ring) started at 12:16 am Sat 5 Jan.

1.245×10^{11} deuterons and 1.179×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.0%, Yellow ramp efficiency: 93.7%.

2:05 am Sat 5 Jan. As per Travis: “Beam decay drop at 0151 corresponds with the sapVert Gpm showing no sidebands - up until this point the blue vert showed sidebands of 10 hamburgers (vertical units). I don’t see a corresponding raise and then flattening out in the IPM data, so the schottky is picking up something else driving the beam but not blowing it up?”

2:06 am Sat 5 Jan. As per Travis: “Beam decay is back on the rise and the sidebands reappear.”

26 Thur 3 Jan

During the early morning (as per Travis Shrey):

Physics ran for 5.2 hours this shift in a single store that only PHENIX was able to use. The STAR pole tip west power supply tripped while at injection. Repairs to the supply required all of the STAR power supplies to be off, so MCR put up a store and had the experimenter ramp down once the Up sequence was finished. After repairs were complete the store was dumped 1 hour early due to poor rates. The next attempt at a fill was thwarted by baby bunches that could not be tuned out and a trip of the Booster main magnet power supply before the gold fill could be complete. As of the end of the shift CAS continues to troubleshoot the BMMPS. The booster F3 extraction kicker has not mispulsed since early in the shift when a pulsed power expert arrived to troubleshoot it. The booster horizontal chrom power supply is reporting a state mismatch that is false. BLIP ran all shift.

Ramp 9515 dAu82 (87 bunches per ring) started at 12:21 am.

1.200×10^{11} deuterons and 0.924×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.2%, Yellow ramp efficiency: 96.9%.

For this ramp yellow injection caused significant beam loss in blue.

During the day (as per Chris Naylor):

Physics ran for 7.62hrs this shift with two stores. The first store wasn’t

very good, but it provided some time for personnel to work on the Au bunch intensity at RHIC injection and the beam loss in the blue ring while injecting in the yellow. After these problems were resolved, the store was dumped early. The second store was put up which lasted the full 6hrs. An attempt was made to put up a third store, but the beam was lost during the ramp by a loss induced permit link interlock. Work was performed on the Booster F3 Extraction Kicker, and the evap cooler to the AGS RF PA had to be de-iced. BLIP ran for 10.87hrs this shift with interruptions due a power supply problem and a target change. As of the end of the shift, recovery of the permit link interlock is underway in preparation for a new fill.

Ramp 9516 dAu82 (87 bunches per ring) started at 8:48 am.

1.152×10^{11} deuterons and 0.869×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.9%, Yellow ramp efficiency: 97.1%.

For this ramp yellow injection again caused significant beam loss in blue.

Greg Marr found that the the baby bunches noted by Travis during the previous shift were actually not baby bunches. It turns out that the WCM signal was not properly terminated and this produced a signal similar to that produced by baby bunches.

Greg also found it necessary to adjust the yellow injection kicker timing: “I added 20nsec to the Yellow kicker timing, that seemed to clear up the Yellow bunch variation. 20 nsec is big, we’ll have to keep an eye on it.”

Vadim found that the vertical separation bump in IR2 was screwed up. This is why yellow injection was causing beam loss in blue.

As per Vadim:

“In IR2 we do not have the vertical orbit data from 1 o’clock triplet, but the orbit corrector strengths at that location was very different from the fills before yesterday (those strengths were changed during SVD orbit correction yesterday). I have restored approximately the corrector strengths in IR2 region to the previous settings, using local bumps. Also, I unloaded the horizontal correctors around yi3-q13 location.”

This fixed the problem of yellow injection causing beam loss in blue.

Ramp 9517 dAu82 (87 bunches per ring) started at 11:47 am.

1.179×10^{11} deuterons and 1.181×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.0%, Yellow ramp efficiency: 93.7%.

Blue rebucketing looks poor for this ramp.

Also, Vadium notes that:

“Yellow mean radial orbit was considerably affected by PHENIX magnet polarity change. Yellow bend trim at the transition can be readjusted by $1e-6$ to $2e-6$ to correct for this, if needed.”

After Store 9517 is dumped (scheduled dump time is 6 pm), Mike Brennan and John Butler would like to setup up blue Landau cavity so that the damper is NOT inserted prior to rebucketing. If this helps blue rebucketing we will stay with this change; otherwise we will revert to the original setup.

During the evening and overnight (as per Brian van Kuik):

Physics ran for 3.4 hour this shift with 3 hours of Machine Setup. There were 5.6 hours of downtime for problems with the bo2-qgt power supply and RHIC RF Stations YA1 and BS3.

At the beginning of shift, a couple ramp attempts to put up a store for physics failed at the Blue transition point. This was caused by the bo2-qgt power supply not jumping with the correct polarity. CAS was instructed by D. Bruno to replace the Jump Card for the b02-qgt power supply, which required an access into RHIC Alcove 3A. After the jump card was replaced, the power supply behaved correctly.

The RHIC RF Stations BS3 and YA1 required J. Butler to come in. J. Butler found that the BS3 Station’s Ingitron temperature was a couple degrees low (due to being turned off for the RHIC 3A Alcove access). J. Bulter lowered the temperature limit for the BS3 Station to come on slightly and was able to turn it back on.

J. Butler then looked at the YA1 RHIC RF Station and found a problem with PASS indication for the CD-1 permissive. W. Lamar and J. Sanfilippo cam in for Access Controls. They found a bad relay (K1) that sends the needed permission for the YA1 RHIC RF Station to be brought on. After replacing the relay, the YA1 RF Station was able to be brought back on.

After all the problems, a store for physics was able to be put up. As of the end of shift, Physics continues to run.

Note (from Kip): **John Butler setup up blue Landau cavity so that the damper is NOT inserted prior to rebucketing.**

Ramp 9522 dAu82 (87 bunches per ring) started at 2:28 am Fri 4 Jan.

1.114×10^{11} deuterons and 1.101×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.5%, Yellow ramp efficiency: 93.1%.

27 Wed 2 Jan

During the early morning (as per Travis Shrey):

APEX ran for 7 hours this shift with downtime due to a variety of things. One outstanding item is the performance of the F3 kicker; the supply gets into a bad state where the output function is not a square wave and varies greatly cycle to cycle. This is currently intermittent; see the booster-AGS elog. The x and y arcs tripped several times this shift on a security fault, but the PASS system seems to be acting normally. As of the end of the shift APEX continues in RHIC and the injectors are being shut off for LOTO and the start of the maintenance period. BLIP ran for 7 hours.

During the day (as per Chris Naylor):

APEX ran for the first hour of the shift; Scheduled Maintenance ran for the remainder. BLIP ran for 3.00hrs with 4.00hrs of Scheduled Maintenance. As of the end of the shift Scheduled Maintenance continues; RHIC sweeps are underway.

During the afternoon and evening (as per Brian van Kuik):

Scheduled Maintenance ran for 5 hours this shift with 3.33 hours of Machine Setup. An access into the Phenix IR to investigate a false local fire alarm for Phenix Equipment racks delayed Machine Setup. As of the end of shift, RHIC has been ramped back to Injection to attempt a ramp for Physics.

BLIP ran all shift.

Notes: S. Perlstein was in for the Booster F3 Kicker. It has been mispulsing while K. Zeno was tuning the Booster and AGS after the Maintenance period. While S. Perlstein was in the Booster F3 Kicker was pulsing normally, but at the end of shift the F3 Kicker began mispulsing again.

During maintenance the polarity of Phenix magnets was reversed.

Maintenance summary from Paul Sampson:

The maintenance went very well today. All critical jobs and nearly all scheduled jobs were completed. Although there was a slight (scheduled) delay in access to RHIC this morning to test AtR security interlocks, most

were completed on time. Booster and AGS accesses and work was completed on schedule. Two surprises complicated recovery, but in the end did not affect turn on. The first problem arose when the UPS in the A10 house became drained. Upon investigation, it was determined that the source power for that unit was inadvertently turned off. After this was determined, the power was restored and the switch was more legibly labeled. The potential delay occurred when the gold source began to fail. Tandem was given time to replace the source and had it on and providing nice input by the time that the Booster and AGS were ready for beam.

Full intensity gold beam was extracted to the W-Dump shortly after 1630hrs, at which time a mode switch showed deuterons were in good shape as well. The RHIC Main Magnet was ready by 1710 and RHIC RF setup was completed by 1820.

During the sweeps, there was a a problem getting 6GE2 reset at STAR which was resolved by the sweepers and delayed that sweep by 15 minutes. All others went well. Setup Began at 1845hrs.

28 Tue 1 Jan

During the early morning (as per Travis Shrey):

Physics ran for 5.5 hours this shift over two stores. The first was inherited from the previous shift and lived out a nominal 6 hour lifetime, although another trip of BA1 hurt the blue lifetime and experimenter ZDC rates. The cavity was reset at injection but tripped during the following up ramp, caused a beam abort and subsequent BLAM alarm. CAS entered the ring and replaced the driver QEI for the supply. The following ramp was successful but suffered from very poor blue rebucketing. The store continues in the machine. BLIP ran all shift.

Ramp 9502 dAu82 (87 bunches per ring) started at 5:45 am.

1.236×10^{11} deuterons and 1.088×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.8%, Yellow ramp efficiency: 98.2%.

During the day (as per Chris Naylor):

Physics ran for 5.70hrs this shift with two stores. The first was inherited from the previous shift which was dumped on time while the second was aborted early due to a PASS failure. BLIP ran all shift. As of the end of the shift, an expert is in to investigate the PASS failure.

10:23 am Todd: “More blue emittance growth on the last two stores, correlating with blue vertical schottky. Sidebands are visible in the DSA pictures too. The ‘flickering’ in store 9500 between 01:00 and 03:00 suggests an intermittent noise source, as the Schottky and DSA data show the noise source turning on and off seven times within this period at irregular intervals.”

Ramp 9503 dAu82 (87 bunches per ring) started at 12:50 pm.

1.168×10^{11} deuterons and 1.175×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.3%, Yellow ramp efficiency: 97.4%.

During the afternoon and evening (as per Brian van Kuik):

Physics ran for 2.3 hours this shift with 1.3 hours of Machine Setup. APEX ran for 3.0 hours this shift. At the beginning of shift there was downtime for Access Controls personnel to clean the contacts for the Peer 7, B Division of the RHIC PASS system. This also caused the sweep for RHIC Sector 6 to be lost on the previous shift Afterwards the RHIC Sector 6, which the Peer 7 governs was reswept for beam operations. As of the end of shift, Accelerator Physics Experiments (APEX) continues to run. There is also an intermittent AGS RF problem in which F. Severino is coming in to repair. With the aid of K. Zeno, the suspect problem is with the wall current monitor signal that feeds the phase loop for the AGS RF. BLIP ran all shift.

Ramp 9504 dAu82 (87 bunches per ring) started at 5:19 pm.

1.212×10^{11} deuterons and 1.099×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.0%, Yellow ramp efficiency: 97.1%.

This store was dumped at 8:11 pm for the start of APEX.

29 Mon 31 Dec

During the day (as per Chris Naylor):

Physics ran for 4hrs this shift with a single store that was inherited from the previous shift. Orbit correction work was done in both rings and steering was performed at STAR and PHENIX in an effort to reduce losses and improve backgrounds. There was 0.42hrs of Experimental Setup due to brief accesses by STAR and PHENIX once the orbit correction work was complete. Siemens had a problem with a blower motor that supplies

air to the Motor Stator of the MG Set. As of the end of the shift we are working to put up an 87 bunch store for Physics. BLIP ran all shift except for a brief interruption as a result of work performed on the LINAC RF.

Notes: T. D'Ottavio released a new version of the TAPE application.

During the afternoon and evening (as per Brian van Kuik):

Physics ran all shift with 1.5 hours of Machine Setup to refill RHIC.

BLIP ran for 8.9 hours this shift. There was 0.1 hours of downtime for a target change in BLIP.

Prior to Ramp 9499, Christoph Montag adjusted horizontal tune and chromaticities at gammat2 stone in blue. This improved ramp efficiency in blue. Yellow ramp efficiency also improved.

Ramp 9499 dAu82 (87 bunches per ring) started at 2:11 pm.

1.151×10^{11} deuterons and 1.097×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.2%, Yellow ramp efficiency: 96.0%.

Ramp 9500 dAu82 (87 bunches per ring) started at 9:10 pm.

1.197×10^{11} deuterons and 1.099×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.3%, Yellow ramp efficiency: 96.9%.

30 Sun 30 Dec

During the day (as per Jim Jamikowski):

Physics ran for 11.13 hours between two stores, the first of which was extended for 1.85 hours due to a flow switch problem at Siemens and Booster low field corrector cooling problems. BLIP ran all shift.

The Booster f7 vertical low field corrector is showing multiple fault indications that appear to be false.

Thomas: "Plots of beam decay, IPM and LF Schottky for last two stores. Correlation is pretty good except for early in store 9494, when a small tune change stopped the decay and then later during that store when tune changes were approximately related to stopping it. No activates are associated with turn-on of noise at 23:15 and with turn-off at 05:04."

Thomas:

"Just for reference these plots show the Lf Schottky, IPM and PHENIX

ZDC. The problem of emittance growth has been with us on and off since Dec. 19 and possibly before. Often it happens at the beginning of the store and it is likely the main reason that blue emittance is larger than the 10 pi we have at injection. I don't think it is beam-beam since it turns off and sometimes turns on quite rapidly in the middle of a store and also, after it turned off, the larger blue beam emittance is then perfectly stable."

"Often the emittance growth happens at the beginning of the store and then rapidly turns off. This is reminiscent of the electron cloud problem we had in PHOBOS. I looked for correlations with vacuum excursions but could not find any. The biggest vacuum excursion is at 12 o'clock near Q3 but not correlated with emittance growth. There is some coincidence in that our problems started on Friday after there was an access for the polarimeter..."

"I also looked in the logs for any vertical corrector that is unstable. None show noise that is correlated with the emittance growth. I did find a noisy corrector PS (bi4-tv14) but the noise is not correlated."

Ramp 9496 dAu82 (87 bunches per ring) started at 1:08 pm.

1.156×10^{11} deuterons and 1.058×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.9%, Yellow ramp efficiency: 95.3%.

Jim Jamilkowski: "The initial Blue beam decay was around 180%, though it fairly quickly dropped to below 10% with no net tuning. Yellow beam decay on the other hand has slowly risen to around 14% even after attempting to tune."

During the evening and overnight (as per Travis Shrey):

Physics ran for 10.2 hours this shift over 3 stores. The first was inherited from the previous shift and extended for 1.5 hours while tandem worked on a beam stability problem. The second lived out a normal 6 hour lifetime and was dumped by Operations. The third remains in the machine. BLIP ran all shift.

Ramp 9497 dAu82 (87 bunches per ring) started at 10:13 pm.

1.174×10^{11} deuterons and 1.087×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.2%, Yellow ramp efficiency: 95.4%.

Ramp 9498 dAu82 (87 bunches per ring) started at 4:51 am Mon 31 Dec.

1.208×10^{11} deuterons and 1.085×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.1%, Yellow ramp efficiency: 95.6%.

31 Sat 29 Dec

During the day (as per Jim Jamilkowski):

Physics ran for 11.17 hours between two stores today. Sextupole power supply yi3-sxf2 tripped off during the second store, causing a significant loss in collision rates before it could be recovered. BLIP ran all shift.

Device read errors are intermittently received for chipmunks NM054, 55, and 56 at the same time on an ongoing basis.

Notes to Operations: M. Sivertz has been consulted: STAR will make a short access to adjust detector electronics after the end of the current store. P. Cameron has set up a copy of the Blue HP DSA spectrogram/GUI interface at acnmcr1p. It can be used to detect a change in the noise floor on the Blue signals should emittance blowup be observed again. A LogView display (RHIC/IPM/Blue-decay-emit-LFtune.lvdisp) has been created to facilitate detection of this condition.

Ramp 9492 dAu82 (87 bunches per ring) started at 6:48 am.

1.224×10^{11} deuterons and 1.107×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 86.9%, Yellow ramp efficiency: 95.7%.

7:28 am. Thomas: “Whatever blows up the blue emittance stopped first at 3:00 am, came back and then stopped again at 3:20 am. Correlation of emittance growth with good vertical blue LF Schottky tune measurements holds.”

For the next fill (9493) Christoph requests: “Please add another unit to blue horizontal chromaticity in stones beta5 and gammat2.”

9:17 am. Thomas: “This is the same plot as I put in above but for the last four stores. It shows that the noise source started briefly Friday morning and then stayed on through the evening into the early morning and then again briefly at the beginning of this store. I checked all the stores since last Friday and there was no other sign of this noise since it stopped during the day of Dec. 21 until yesterday. Any ideas of what this could be?”

Ramp 9493 dAu82 (87 bunches per ring) started at 1:39 pm.

1.216×10^{11} deuterons and 1.093×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.5%, Yellow ramp efficiency: 95.3%.

Christoph: “Blue ramp efficiency has again improved a little. Please raise horizontal chromaticity around transition some more, +1 unit in stones

beta5, gammat2 and gammat3.”

Yellow lifetime is poor (10% to 20% decay rate).

Don Bruno: “yi3-sxf2-ps tripped again today around 17:29. The last time it tripped was on 12/25. The setpoint drops out and then the supply gets tripped by the quench detector. We have already swapped out the current regulator card, setpoint card in the power supply 3u chassis, and the medium res card. The only 2 things that are left are the backplane in the power supply 3u chassis and the cable that takes the setpoint from the medium res card to the power supply 3u chassis. I had CAS wiggle this cable while we were sitting at current on 12/25 and I did not see anything happen. If MCR wants I can have CAS swap out the power supply 3u chassis next. I don’t think the wfg is the problem because I don’t see the wfg moving on the snapshots.”

During the evening and overnight (as per Vincent Schoefer):

Physics continued largely uninterrupted on this shift. There were several server/manager communications issues which were resolved with stops and restarts of the affected software. Lifetime/emittance problems in blue continue to shorten the luminosity lifetime.

Ramp 9494 dAu82 (87 bunches per ring) started at 9:11 pm.

1.211×10^{11} deuterons and 1.042×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 87.8%, Yellow ramp efficiency: 94.0%.

Christoph: “Please raise blue horizontal chromaticities in stones beta5, gammat2, and gammat3 by +1 unit.”

Vincent: “Dropped both blue tunes by 0.002 to get pretty nice improvement (in lifetime). Not much luck in yellow, although small chrom increases seemed to help.”

Thomas: “The bottom plot actually shows that the LF Schottky tune measurements are good and therefore the noise source seems to be present. This can also be seen from the spectrum a few entries lower. The emittance growth and beam decay are similar to store 9492. However, beam decay was stopped with tune change this time.”

Thomas: “First plot is the blue beam decay and the quad current. Second plot is the betatron sideband of the blue vertical LF Schottky. Clearly a very small (.001) vertical blue tune change stopped the blue beam decay, followed by the disappearance of the Schottky betatron sidebands. This could be explained if the noise source is ripple of a vertical dipole

(corrector or injection kicker).”

Wolfram: “Around 23:10 the emittance growth accelerated again. Around 0:10 we first decreased the Blue vertical tune by 0.001 (small increase in loss rate), then increased the vertical tune by finally 0.0015 (from the original value), bringing the down the loss rate (the emittance growth also seem to level off, see below). Also tried a horizontal tune change of -0.001 but this did not change the trend in the loss rate already established. Since a small tune change can suppress the emittance growth, the excitation could be on all the time but is narrow band near the betatron tune.”

Ramp 9495 dAu82 (87 bunches per ring) started at 4:24 am.

1.270×10^{11} deuterons and 1.081×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.1%, Yellow ramp efficiency: 94.1%.

32 Fri 28 Dec

During the day (as per Brian van Kuik):

Physics ran for 6.5 hours this shift with 3.7 hours of machine setup. There were two main sources of downtime this shift. The first source of downtime for this shift were Star’s Main Magnet; Main, East Poletip, and West Poletip power supplies tripped off causing a store for physics to be aborted. A store for physics was then put up and dumped normally at the end of six hours. The second source was a delay generator for the Low Level RF(LLRF), which controls the phasing of the master/slave setting for Blue and Yellow rings, was found turned off. A store was then put up once the Yellow Acceleration RF Cavities’ High Voltage came back on. As of the end of shift, Physics continues to run.

BLIP is running.

Notes: Pumproom has notified MCR that they turned off the 902 Cooling Tower for the weekend. R. Atkins has permanently removed chipmunk NM211 from the system

Ramp 9486 dAu82 (87 bunches per ring) started at 8:14 am.

1.103×10^{11} deuterons and 1.125×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.6%, Yellow ramp efficiency: 96.4%.

Star magnet went off and yellow beam lifetime deteriorated (slowly) until loss monitor pulled the permit at 8:33 am.

Ramp 9487 dAu82 (87 bunches per ring) started at 9:38 am.

1.228×10^{11} deuterons and 1.024×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 86.9%, Yellow ramp efficiency: 96.5%.

BTF 9487 (9:48 am):

$Q_H = 0.2320$, $Q_V = 0.2248$ in blue;

$Q_H = 0.2231$, $Q_V = 0.2317$ in yellow.

BTF 9487 (1:58 pm):

$Q_H = 0.2337$, $Q_V = 0.2255$ in blue;

$Q_H = 0.2235$, $Q_V = 0.2350$ in yellow.

Elog (rhic-dau-2008) entries from Todd, Wolfram, and Brian van Kuik:

1:46 pm: Orbit statistics during this store (9487) for blue/yellow horizontal/vertical RMS. The red trace clearly shows the yellow vertical orbit corrections, and the green trace clearly shows vertical RMS orbit growth in blue with no correction. This indicates that we should routinely correct vertical orbits in both rings; this should have a net positive effect, as shown above already. We'll work to make this happen for the next store.

4:08 pm: I've added a "Start routine orbit correction for store" entry to the tape Up sequence. This will run an automatic vertical orbit correction in both rings at store every 60 minutes, similar to the automatic BTFs. To turn this off during a store, set the StoreOrbCorr parameter in pet RHIC/Magnets/Ramp to Off in EITHER ring. If this parameter is off in EITHER ring, no orbit corrections will run even if the tape step is executed. We'll see how this goes during the next store, and pull the plug if it looks like a problem.

For the next ramp (9490) Christoph Montag lowered blue horizontal tunes around transition by 0.003 in beta5 and 0.005 in gammat2 and gammat3 to get away from the 1/4 resonance. To avoid potential coupling problems he also lowered the vertical tunes in those stones by 0.003.

Ramp 9490 dAu82 (87 bunches per ring) started at 6:39 pm.

1.085×10^{11} deuterons and 1.053×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 82.6%, Yellow ramp efficiency: 95.4%.

As per Christoph (8:37 pm): "The blue transition loss got worse. Please revert my tune changes as of 9:50 this morning. The better way to fight this beam loss seems to be reducing the horizontal chromaticity before

transition. Please add one unit in stones beta5 and gammat2.”

BTF 9490 (7:50 pm):

$Q_H = 0.2318$, $Q_V = 0.2218$ in blue;

$Q_H = 0.2340$, $Q_V = 0.2327$ in yellow.

Lifetime in blue is poor; decay rate is 20% to 25% per hour.

During the evening and overnight (as per Vincent Schoefer):

Physics ran for 9.42 hours this shift. Deuteron emittance and lifetime at store have deteriorated over the past three stores, but the cause has yet to be determined. The Booster A6 RF cavity tripped once on this shift during a mode switch to deuterons.

Notes to operations: **Vertical orbit corrections at store now happen automatically in both rings every thirty minutes (using the “best corrector” algorithm).** The corrections are run by a script which is launched by the last step in the Up sequence, “Start routine orbit correction for store”. The corrections can be stopped by changing the “StoreOrbCorr” parameter on the pet page RHIC/Magnets/Ramp to Off. Setting the parameter Off in either ring will stop the corrections from happening in both rings, even if the step in tape was run during the Up sequence.

Roser (10:46 pm) “The blue emittance is growing again and the blue vertical LF Schottky tune signal has low noise again as it did on December 21 (see entry on 12/21 13:34). We suspected a noise source on the blue vertical at the time but the effect went away after that store until now. Note that Pete made entry to IR2 before this store to connect the Blue LF Schottky to direct cables out of the tunnel.”

Ramp 9491 dAu82 (87 bunches per ring) started at 11:17 pm.

1.223×10^{11} deuterons and 1.109×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 85.7%, Yellow ramp efficiency: 96.0%.

As per Vincent: “The vertical tune has increased over the course of the store. Only recently, since the v tune has gotten to be > 0.226 or so has the beam decay dropped (and it has, it is about 5% now, down from 20%). This is consistent with Wolfram’s plot from 12/13. This is admittedly from a previous ramp (dAu80, I think) but I see no reason why it shouldn’t still hold true. At this point, changing the tune at the end of this store and seeing what happens is probably pointless, since the vertical spectrum is significantly different from when we started, but I think it’s worth updating

the vertical tune in blue by about 0.005 for the next ramp. I know, this doesn't explain the emittance growth (which was not present even in bad blue stores from before Wolfram's tune change). But it's possible that we have two problems."

33 Thur 27 Dec

During the early morning (as per Vincent Schoefer):

Physics ran for the 6.7 hours this shift in two stores with the dAu82 ramp (low beta squeeze in both rings), the second of which continues as of the end of the shift.

Ramp 9482 dAu82 (87 bunches per ring) started at 3:02 am.

1.238×10^{11} deuterons and 1.080×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.1%, Yellow ramp efficiency: 95.4%.

During the day (as per Brian van Kuik):

Physics ran for 8.7 hours this shift with 2.3 hours of Machine Setup. There was 1 hour of Experimental Setup between the two stores that ran this shift for Star and Phenix Experimenters. During the Access Fire Alarm technicians entered the Star IR to reset Star's Inergen system. Also D. Beavis access the W-line with HP to survey the W-dump. As of the end of shift Physics continues to run.

BLIP ran all shift.

Ramp 9483 dAu82 (87 bunches per ring) started at 10:01 am.

1.222×10^{11} deuterons and 1.078×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 86.8%, Yellow ramp efficiency: 96.1%.

Ramp 9484 dAu82 (87 bunches per ring) started at 6:29 pm.

1.116×10^{11} deuterons and 1.112×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 86.4%, Yellow ramp efficiency: 96.6%.

During the evening and overnight (as per Travis Shrey):

Physics ran for 10.7 hour this shift over two stores. The first store was inherited from the previous shift and was dumped after a normal lifetime. After a short STAR IR access another store followed that continues in the machine. BLIP ran all shift. NOTE TO OPERATIONS: When RhicInjection auto correct for injection steering malfunctions (and maxes

out the lambertson) “Revert” does NOT work correctly.

Ramp 9485 dAu82 (87 bunches per ring) started at 1:23 am Fri 28 Dec.

1.217×10^{11} deuterons and 1.215×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.0%, Yellow ramp efficiency: 93.4%.

Travis comments: “Just a note, the Fill intensity reported for blue is taken immediately after filling. We do not ramp with the reported blue intensity – this store (9485) we had quite a bit more yellow beam than blue. Also, the machine seems to be able to take 1.2/bunch Au okay – a little more transition loss than usual but otherwise it’s fine.”

34 Wed 26 Dec

During the early morning (as per Vincent Schoefer):

Physics was impeded on this shift by a series of equipment problems. At the end of the store inherited from the last shift, we made accesses into the RHIC ring to remedy problems with yi3-sxf2-ps and RF cavities X1, X2 and YS3. A setpoint card was swapped out of yi3-sxf2; if the supply trips again, it will be necessary for the controls hardware group to supply a spare medium resolution board to be swapped into the supply. As of the end of the shift RF personnel are investigating a problem with the YA1 power amplifier.

Ramp 9472 dAu81 (87 bunches per ring) started at 4:07 am.

1.083×10^{11} deuterons and 0.946×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.7%, Yellow ramp efficiency: 96.4%.

4:15 am: The X1 RF cavity tripped as it was coming up to voltage for rebucketing. D. Goldberg is attempting to bring on the cavity before we continue.

4:18 am: As the X1 cavity came up to voltage this time about 20% of the yellow beam and 50% of the blue beam became debunched. We will attempt to gap clean and abort the store.

4:24 am: Beam induced quench. When the blue gap cleaning came on, the loss rate of the debunched beam caused a permit pull, firing the abort kickers in beam-filled gaps. We have BLAM 90% of hourly loss alarms and are prohibited from injecting until 5:24 am.

During the day (as per Brian van Kuik):

Accelerator Physics Experiments (APEX) ran for 4 hours this shift. There was 1 hour of Experimenter Setup to allow Phenix to troubleshoot problems with their North Muon detector. Two hours of downtime at the beginning of shift were needed to repair the YA1 RHIC RF Station's Grid Bais power supply.

BLIP ran all shift.

During the afternoon and evening (as per Travis Shrey):

APEX ran for 2.5 hours this shift and ended early after a successful store was established for the experimenters. This store was then dumped after 45 minutes to allow both experiments IR access. Another store followed and continues in the machine. Total physics time was 3.5 hours. BLIP ran all shift.

Switched to Ramp dAu82 which has reduced beta-star in both yellow and blue.

Ramp 9479 dAu82 (87 bunches per ring) started at 2:39 pm.

1.193×10^{11} deuterons and 1.027×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 87.1%, Yellow ramp efficiency: 94.5%.

Ramp 9481 dAu82 (87 bunches per ring) started at 9:57 pm.

1.200×10^{11} deuterons and 1.107×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.1%, Yellow ramp efficiency: 95.3%.

35 Tue 25 Dec

During the early morning (as per Vincent Schoefer):

Physics and BLIP ran for the entire shift. The power supply yi3-sxf2 tripped off at store (9466) but was brought back on remotely. As of the end of the shift, a physics store continues in RHIC.

Ramp 9467 dAu81 (87 bunches per ring) started at 6:37 am.

1.216×10^{11} deuterons and 0.972×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 90.8%, Yellow ramp efficiency: 95.8%.

During the day (as per Brian van Kuik):

Physics ran for 5.8 hours this shift with 1.2 hours of Machine setup to refill RHIC. As of the end of shift RHIC is ramping to flattop. BLIP ran for 6.9

hours.

Wolfram: “Another proposal for the Blue octupole settings, to restrict their effect to the time around transition, when we really need them to suppress instabilities. Above are the current settings (“old”) and the proposed settings (“new”). The blue vertical line at 77.3 s marks the transition crossing. At this point the design values in the RampEditor become a burden, but it would not be a good idea to change this today. To create the new settings we have to put into the Blue octupole trim strengths:”

injection: +0

gammat1: +5

gammat2: -3

gammat3: -3

still5: +5

gammat6: +5

t140: +0

All other trim settings should be interpolated.

Ramp 9468 dAu81 (87 bunches per ring) started at 1:58 pm.

1.097×10^{11} deuterons and 1.017×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.8%, Yellow ramp efficiency: 91.9%.

During the afternoon and evening (as per Travis Shrey):

Physics ran for 7 hours this shift over two sub-par stores. The first store suffered from a significant yellow debunch event shortly after it began; the store was ended after 4 hours based on ZDC rates. The second store suffered beam loss when yi3-sxf2 tripped and later had a debunch event in both blue and yellow rings. The current store has a scheduled dump time of 2345, again based on ZDC rates. It appears the debunching for both stores was a result of a voltage drop in the X2 common cavity. See the rhic-dAu elog for more details. At the conclusion of the store RF personnel will be in to look at the X1, X2 and YS3 cavities and CAS will perform more card replacements for yi3-sxf2. BLIP ran for 8.7 hours.

Wolfram: “For the next ramp (9469) we could reduce the Blue trim octupole strength in gammat2 and gammat3 from -3 to -2. This will give the same total octupole strength at transition as we had yesterday (since we changed the wave form today), and should further increase the Blue

ramp transmission.”

“We can implement the same octupole waveform for the Yellow ramp that we have in Blue (shifted in time since the gammat-jump is 7.7 sec later). We are currently losing about 8% of the Yellow intensity from accramp to transition. This should be less with the new octupole strengths. To make the new waveform shown above, we need to put in the following Yellow octupole trim strengths:”

injection: +0

gammat1: +5

beta5: +5

gammat4: -1

gammat5: -1

gammat6: +5

t140: +0

All other trim settings should be interpolated.

Ramp 9469 dAu81 (87 bunches per ring) started at 7:48 pm.

1.102×10^{11} deuterons and 1.048×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.6%, Yellow ramp efficiency: 97.6%.

36 Mon 24 Dec

During the day (as per Brian van Kuik):

Physics ran for 3.4 hours this shift with 1.4 hours of Machine Setup. Work repairing the RHIC BA1 28 MHz power amplifier comprised the majority of the downtime this shift. A misplaced key and work on the Switchyard Upstream Escape Gate made up the remainder of the downtime. As of the end of shift, Physics continues to run. BLIP ran for 6.8 hours.

Ramp 9464 dAu81 (87 bunches per ring) started at 10:23 am.

1.233×10^{11} deuterons and 0.993×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.2%, Yellow ramp efficiency: 93.5%.

At store as per Wolfram Fischer: “Raised Yellow hor by 0.0015, lowered Yellow ver by 0.0005, resulting in small improvements in the Yellow beam lifetime. Changes in chromaticity tried but did not yield any improvement.

Yellow decay rate settled at 6%/h”.

During the afternoon and evening (as per Travis Shrey):

Physics ran for 8.5 hours this shift in two stores. The first was inherited from the previous shift, the second continues in the machine. YS3 RF cavity tripped up the ramp, was restored and tripped again during rebucketing. BLIP ran for 8.6 hours.

Wolfram: “A proposal for the next ramp (9465) to explore the losses before transition (triggered by this morning’s discussion on octupoles, initiated by Dejan). Blue gammat is 77.3 sec after accramp, the octupoles start ramping up at accramp. This morning we saw an improvement in the Blue beam lifetime by reducing the octupole strength. It would be sufficient to start ramping at t40 (then there are still more than 30 sec to gammat). For this we need to put +3 into the Blue t40 NONLINEAR trim pebble (currently -1.2251 from interpolation) to zero out the -3 design strength. A smaller change can be considered.”

Ramp 9465 dAu81 (87 bunches per ring) started at 4:52 pm.

1.104×10^{11} deuterons and 0.931×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 90.1%, Yellow ramp efficiency: 91.1%.

Wolfram: “I’d say that (ramp 9465) looks better than before, the Blue losses set in later than in the previous ramps. Still some further optimization possible.”

“For the next ramp (9466) we could make further changes in the Blue octupole strength: in gammat1 change all trim settings from -2 to $+1$, in beta5 change all settings to -2 (explicitly, the current value is interpolated).”

“For the next ramp (9466) in Yellow we could change the trim octupole settings in t40 to $+3$ (currently interpolated, the same as we have done in Blue on this ramp).”

Ramp 9466 dAu81 (87 bunches per ring) started at 11:45 pm.

1.184×10^{11} deuterons and 1.042×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.7%, Yellow ramp efficiency: 93.7%.

37 Sun 23 Dec

During the day (as per Brian van Kuik):

Physics ran for 7.1 hours shift with 1.8 hours of Machine Setup. Physics was comprised of two stores this shift with one beginning and the other towards the end of this shift. Experimenter Setup ran at the end of the first store an access for Phenix and Star Experimenters into their IRs which ran for 1.2 hours. There were 1.9 hours of downtime due to the Switchyard Upstream Escape Gate losing both the primary and redundant resets.

BLIP ran all shift.

Notes: Access Controls would like to look at the Switchyard Upstream Escape Gate during the day tomorrow to adjust the deadbolt for the gate.

Ramp 9459 dAu81 (87 bunches per ring) started at 7:33 am.

1.125×10^{11} deuterons and 1.099×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.9%, Yellow ramp efficiency: 93.3%.

Store 9459: vertical dipole corrector problem?

Ramp 9460 dAu81 (87 bunches per ring) started at 5:33 pm.

1.261×10^{11} deuterons and 1.097×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 86.1%, Yellow ramp efficiency: 92.1%.

Yellow sextupole trip (Sunday evening) during store 9460.

During the evening and overnight (as per Vincent Schoefer):

Physics ran for 5.2 hours in two stores this shift. We elected to dump the first store early after a sextupole trip in the yellow ring caused a large amount of the yellow beam to be lost. The second store ran for about 4 hours. That store was aborted when blue RF cavity BA1 dropped to zero voltage. Since BA2 had tripped earlier in the store, the lack of voltage on the blue RF cavities caused the permit to be pulled and the store to be aborted. The regulator for the Booster C1 injection bump was also replaced on this shift when a resistor and a transistor inside the regulator were found to be burnt out. As of the end of the shift, the repair of the power amplifier for BA1 continues.

Ramp 9461 dAu81 (87 bunches per ring) started at 9:13 pm.

1.194×10^{11} deuterons and 1.045×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.0%, Yellow ramp efficiency: 87.7%.

Store 9461 aborted when BA1 tripped (early monday morning).

38 Sat 22 Dec

During the day (as per Travis Shrey):

Physics ran for 10.1 hours this shift over two stores, the second of which continues in the machine. Aside from an IR access while STAR reset a tripped crate there was no downtime. BLIP ran all shift.

Ramp 9454 dAu81 (87 bunches per ring) started at 7:15 am.

1.182×10^{11} deuterons and 1.051×10^9 gold ions per bunch at injection.

Yellow lifetime is poor for store 9454.

Blue ramp efficiency: 86.6%, Yellow ramp efficiency: 92.4%.

Ramp 9455 dAu81 (87 bunches per ring) started at 2:41 pm.

1.197×10^{11} deuterons and 1.068×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 82.2%, Yellow ramp efficiency: 94.7%.

Good store. Yellow lifetime for 9455 improved by lowering vertical chromaticity at store by one unit. This store ended in a yellow magnet quench “possibly due to efforts to restore voltage on the yellow abort kickers”.

During the evening and overnight (as per Jim Jamilkowski):

Physics ran for 3.57 hours between two stores. The first store ended in a Yellow magnet quench possibly due to efforts to restore voltage on the Yellow abort kickers. One of the secondary effects of the quench was that fuses blew for the ODH sensors at 8AS1 (near the collimators). After W. Lamar and J. Sanfillippo fixed the problem, a second store was put up and eventually aborted by a Yellow QLI that was caused by the y-qmain power supply. As of the end of the shift, C. Schultheiss has completed repairs to the y-qmain, and we are almost ready to inject into Blue.

Both acnmcr5s and acnmcr6s have come down with the screen lock problem.

Note to Operations: If bo2-qgt trips while ramping from park to injection try the following: clear the fault and bring the power supply on at a zero setpoint, and use pet to ramp the supply to 1 A over 30 seconds, Once the current matches the iref, the supply can be ramped up to its injection setpoint of 1.71 A. This issue stems from a discrepancy between the WFG and iref that may indicate a problem with the low res or current regulator cards.

Ramp 9457 dAu81 (87 bunches per ring) started at 1:32 am Sun 23 Dec.

1.205×10^{11} deuterons and 1.055×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 85.4%, Yellow ramp efficiency: 93.8%.

Store 9457 was brought early Sunday morning down by a yellow QLI caused by the y-qmain supply.

39 Fri 21 Dec

During the day (As per Travis Shrey):

Physics ran in RHIC for 7 hours this shift over two stores. The first was put up by the previous shift, the second continues in the machine. BLIP ran all shift. Modifications were made to the blue abort kicker smoke alarm system. New response instructions can be found in the Daily Orders.

Emittance blow-up in blue is huge for stores 9449 and 9451.

Roser: “What is blowing up the blue horizontal emittance? Whatever it is it stopped for a while between 7:40 and 9:20. Clearly BBQ is first in line as a possible culprit.”

Al Dellapenna: “Thomas, although it does make sense that the BBQ will and could do this emittance growth, the amps were indeed OFF during that time frame....they have been off since 5:30pm yesterday.”

Marr: “At Dejan’s suggestion we added some octupole strength at injection, it will interpolate from -2 to -7 at transition.”

As per Brennan, Freddy, and Peggy: We worked on the ATR syschro in the AGS to improve the phase accuracy shot-to-shot. We also checked the phasing of the Blue acceleration cavities. They are within 1 degree, so this would not explain a squeeze in the moving bucket area during the start of the ramp. A check of the total rf voltage in Blue from the synchrotron sidebands from the Blue stochastic cooling pickup gives 275 kV. The setpoint is 300 kV. We should recheck this when the high frequency Schottky cavity signal is back in operation. I think we should ramp with only the two changes that we made so far. One: reduced gain in the WCM signal for the phase detector, Two: changes to ATR synchro.

Ramp 9452 dAu81 (87 bunches per ring) started at 5:02 pm.

1.341×10^{11} deuterons and 1.089×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.8%, Yellow ramp efficiency: 95.7%.

Good store. The blue emittance growth seen in stores 9449 and 9451 is not present in this store.

During the evening and overnight (as per Jim Jamilkowski):

Physics ran for 10.33 hours between two stores. BLIP ran all shift.

Note to Operations: K.L. Zeno has written instructions for maintaining BTA transfer for gold in the Booster/AGS dAu elog.

Ramp 9453 dAu81 (87 bunches per ring) started at 12:10 am Sat 22 Dec.

1.250×10^{11} deuterons and 1.064×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.3%, Yellow ramp efficiency: 92.0%.

The blue emittance growth seen in stores 9449 and 9451 is not present in stores 9452 and 9453. Yellow lifetime is poor for store 9453.

40 Thur 20 Dec

During the early morning (as per Jim Jamilkowski):

Physics ran for 6.18 hours between two stores. STAR experimenters made an access to their IR for 0.73 hours between stores. As of the end of the shift, CAS is entering RHIC in order to check on the status of the Blue abort kicker.

Booster third integer stopband corrector power supply b-3sxx3 has tripped multiple times tonight on transistor overtemp and regulation errors.

Ramp 9440 dAu81 (87 bunches per ring) started at 6:05 pm.

1.107×10^{11} deuterons and 1.066×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 85.6%, Yellow ramp efficiency: 90.5%.

During the day (As per Travis Shrey):

Physics ran in RHIC a very small amount of time this shift. Over the course of 5 attempted stores there was a maximum of 30 minutes of Physics. The last two ramp failures had identical signatures, with beam losses rising over the last 2 seconds before the blue link quenches. Many experts are currently investigating the possible cause of this beam loss. The strainer for b-3sxx3-ps was changed today; the supply has not tripped since. Angelika reports that the S2 channel is the correct parameter to look at for PHENIX backgrounds. She has put that channel in the gpm that lives in the collimator program.

Email from Angelika regarding Phenix background signals and study:

After talking to Mike Leitch we have changed the signals to look at for PHENIX backgrounds (using one of the scintillators close to the Q2 magnet rather than one closer to the detector). It's S2 (blue) and N2 (yellow). There is a new GPM monitor reflecting this change: AllExpBkgdFy08.mon. This is also being logged now. The collimator application was changed accordingly. At this point just look to minimize these signals as there are no operational limits from PHENIX yet. There is no subtraction of a collision component (but from looking at pervious vernier scans there seem to be no need of that!).

In order to get to those limits we'll have to study the correlation between collimator position, background rate seen in S2 and the current in the MuID tubes. The update rate of the latter is slow: approximately 2 minutes. We'll need some study time to look at this correlation:

1. Normal physics store, do everything as usual, bring in all collimators.
2. Wait for a few minutes for things to settle.
3. Call PHENIX (so they can start a special run if they want), sit for about 10-15 min.
4. Pull out collimators until you see a significant increase (order of 30% or so) in the S2 signal, sit there for 10 min. (Wait for PHENIX to tell you.)
5. Pull them out further (or fully - PHENIX will tell you if they can still get their data), sit there again for 10 min.
6. After that, bring collimators back in.

During the evening and overnight (as per Vincent Schoefer):

Physics ran for approximately five hours in two stores on the shift. The start of the first store was delayed by recovery from a blue quench incurred on the previous shift. The first store was ended by a blown fuse in the blue abort kicker. The next ramp did not make it to physics before a PASS failure aborted the beam and caused the six o'clock sweeps to be lost. As of the end of the shift, we have recovered from that and a physics store continues in RHIC.

Ramp 9449 dAu81 (87 bunches per ring) started at 7:55 pm.

1.046×10^{11} deuterons and 1.074×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 84.3%, Yellow ramp efficiency: 92.1%.

This store (9449) was brought down by a blue abort kicker blown fuse.

Ramp 9450 dAu81 (87 bunches per ring) started at 2:47 am Fri 21 Dec.

1.106×10^{11} deuterons and 1.080×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 83.9%, Yellow ramp efficiency: 92.6%.

This store (9450) was brought down by a PASS failure.

Ramp 9451 dAu81 (87 bunches per ring) started at 6:10 am Fri 21 Dec.

1.232×10^{11} deuterons and 1.016×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 82.3%, Yellow ramp efficiency: 94.0%.

41 Wed 19 Dec

During the early morning (as per Jim Jamilkowski):

APEX ran for 6.72 hours.

The Booster A6 RF station tripped off on each mode switch to gold until CAS adjusted the overvoltage trip threshold.

acnmcr1s came down with the screen lock problem.

Note to Operations: Ramp dAu81 is currently loaded. A decision will be made today on which ramp will be used for physics later today.

Ramp 9430 dAu81 (87 bunches per ring) started at 3:17 am.

1.055×10^{11} deuterons and 0.964×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.3%, Yellow ramp efficiency: 92.3%.

As per Fulvia: This physics ramp with dAu81 yielded initial rates of approximately 85 kHz (extrapolating Phenix after optimization) with an average bunch intensity at store of approximately 0.85. Cogging, rebucketing, steering and collimation all worked. So this ramp can be used for physics if we decide to do that.

During the day (as per Travis Shrey):

APEX ran in RHIC for the first hour of the shift. Scheduled maintenance ran for the remainder of the day. BLIP ran for 6.6 hours. NOTE: The wf3 flag has been mechanically disabled until the next maintenance day. The

retract limit switch is not currently engaged, so software controls will report a “middle” indication. MCR has acknowledged the alarm on ADT.

During the afternoon and evening (as per Vincent Schoefer):

This shift was comprised of an afternoon of maintenance activities and the return to physics therefrom. See the 1932 entry below for a summary of the maintenance activities. As of the end of the shift there is an 87x87 physics store in RHIC.

Notes to operations: There is a commissioning version of RhicInjection available which automates the inhibiting/enabling of the Booster RF high voltage while injecting into RHIC. The location can be found in StartUp/start/Commissioning/RhicInjection(AutoBeamEnable). Be aware that the application currently does not inhibit the Booster RF after completing a “Fill Blue” or “Fill Yellow” request.

Maintenance summary from Paul Sampson:

The Repair and Maintenance period went well today, considering the scope and complications that arose. The AGS got a bit of a late start due in part to the fact that LOTO started after 0700 and that Restricted Access was being applied. In all, the AGS jobs were completed on time with the exception of the vacuum pipe replacement. After installation, one of the flange seals had to be replaced (twice) in order to hold vacuum. This delayed the AGS recovery by several hours. The Tandem and Booster were available on time. The AGS recovery was further delayed when the J10 bump supply’s tap change (completed today in response to the vacuum woes of late) had to be compensated for before beam could be injected. K. Zeno and L. Ahrens spent some time on the telephone before beam was injected. As of 1930, Beam in accelerating in the AGS to extraction but not well due to de-bunching (synchro problem?). Experts are being consulted. RHIC sweeps are completed. All sweeps went well except for PHENIX which was delayed when Operators were unable to get a particular gate reset. Assistance from Access Controls was necessary.

Ramp 9439 dAu81 (87 bunches per ring) started at 10:30 pm.

1.129×10^{11} deuterons and 1.093×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 83.5%, Yellow ramp efficiency: 92.3%.

42 Tue 18 Dec

During the early morning (as per Jim Jamilkowski):

Physics ran for 7.08 hours between two stores. BLIP ran all shift.

Chipmunk NM216 tripped on both failsafe and radiation interlocks during periods where there was no beam in the ATR with a frequency of every few minutes for awhile tonight. R. Atkins came in and attempted to diagnose the problem, though it stopped occurring after the chipmunk enclosure was released from the icy grip of old man winter.

acnmcr4p has a screen lock problem that is preventing any keystrokes from registering. There is also a slew of samagent, sh, cp, and copyReadTime processes running on the machine.

For the first store tonight, Yellow stochastic cooling did not automatically start up. The manager never detected that the equipment had been fully inserted, though this appears to have not been the case. In response, the tape sequence was resumed with no further difficulties. W. Fu should be contacted to investigate during the daytime. On the subsequent store, no such difficulties were encountered.

Ramp 9417 (87 bunches per ring) started at 5:49 am.

1.152×10^{11} deuterons and 1.112×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 84.8%, Yellow ramp efficiency: 81.3%.

During the day

As per Travis Shrey: Physics ran in RHIC for 3 hours this morning in the store from the previous shift. A machine development period followed during which the dAu81 ramp was set up. As of the end of the shift we are putting up a ramp for physics. b-3sxx3-ps tripped twice this shift. Each time it was brought on remotely from MCR. BLIP ran all shift.

Switched to Ramp dAu81 with reduced beta-star in yellow.

Ramp 9421 dAu81 (87 bunches per ring) started at 2:27 pm.

1.161×10^{11} deuterons and 0.998×10^9 gold ions per bunch at injection.

The beam was aborted by a loss monitor permit pull just after the beams were clogged.

Back to ramp dAu80 until APEX begins this evening.

During the afternoon and evening (as per Vincent Schoefer):

Physics ran for 1.5 hours this shift. Much of the shift was spent recovering from a blue abort kicker prefire during the first physics store. The same abort kicker module (PFN4) prefired during the hysteresis ramp during the recovery process. As of the end of the shift, APEX is in progress.

Ramp 9427 dAu80 (87 bunches per ring) started at 7:09 pm.

1.170×10^{11} deuterons and 1.073×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 87.1%, Yellow ramp efficiency: 88.4%.

Ramp 9428 dAu81 (87 bunches per ring) started at 10:12 pm.

1.051×10^{11} deuterons and 0.905×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 85.7%, Yellow ramp efficiency: 93.0%.

For this ramp, the blue fill pattern was shifted by a bucket by mistake. As a result there were only 40 colliding bunches at PHENIX (instead of 87).

Ramp 9429 dAu81 (87 bunches per ring) started at 11:34 pm.

1.016×10^{11} deuterons and 0.964×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 87.8%, Yellow ramp efficiency: 91.1%.

43 Mon 17 Dec

During the early morning

Ramp 9412 (87 bunches per ring) started at 4:59 am.

1.157×10^{11} deuterons and 0.933×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.7%, Yellow ramp efficiency: 90.2%.

During the day

As per Travis: Physics ran in RHIC for 4 hours this shift in a single store that was inherited. After dumping the beam machine development ran with work focusing on scrubbing the 6 o'clock IR. In order to get the beams clogged at injection energy the storage target frequency was changed via the RF/SystemControl page and will need to be restored before attempting the next physics ramp. BLIP ran for all but 10 minutes.

Angelika turned off blue gap cleaning all together and turned off yellow horizontal gap cleaning as well.

Waldo and operations did scrubbing at injection with 108 bunches per ring.

During the afternoon and evening (as per Vincent Schoefer):

Physics ran for about four hours in one store on this shift. The early part of the shift was used to do beam scrubbing of the RHIC vacuum while sitting at injection. The physics store put up thereafter had to be dumped when it was found that the blue beam sync clock became unsynchronized to the beam. This results in a loss of appropriate timing for our instrumentation and an inability of PHENIX to take data since they use the blue beam sync clock to time their detectors. The dump of that store was not clean, which was expected since the nature of the failure prevents appropriate timing of the abort kicker relative to the abort gap. As of the end of the shift we are ramping up an 87x87 bunch store for physics.

Ramp 9414 (87 bunches per ring) started at 3:32 pm.

1.095×10^{11} deuterons and 1.017×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.1%, Yellow ramp efficiency: 93.8%.

Ramp 9416 (87 bunches per ring) started at 10:58 pm.

1.079×10^{11} deuterons and 1.021×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.7%, Yellow ramp efficiency: 90.6%.

44 Sun 16 Dec

During the day

As per Chris Naylor: Physics ran for 9.57hrs over the course of three stores with only a brief period of down time. The first store we inherited from the previous shift which was dumped on time. The second store was lost early as a result of working with the GapCleaner. The third store continues in the machine as of the end of the shift. BLIP ran all shift.

Ramp 9407 (87 bunches per ring) started at 5:59 am Sun 16 Dec.

1.123×10^{11} deuterons and 1.104×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.9%, Yellow ramp efficiency: 90.2%.

Wolfram's comments on ramp 9407:

1. The Blue bunch pattern shows systematic variation along the train, the instability may have only affected the emittance. We could further increase the Blue octupole strength at transition (there are no beam losses after transition). To make a smaller change we can go from a trim strength of -2 to -3 in gammat6 only. We only need

more stability 200ms after the gammat event.

2. Yellow has 2 problems. The first 6 bunches have less intensity than the average, probably caused by the gap cleaner. Please contact Angelika or Rob for changes in the gap cleaner. The second problem is beam-beam effect. Bunches in buckets 214 to 235 have better lifetime because they experience only 1 collision. The Yellow beam loss rate 2.5h into the store is 10%/h, twice as large as we had in good stores. Previously this could be remedied with tune changes.
3. This is the last tune measurement in Yellow (.224,.234), fairly close to what should be a good tune (.225.235). May be we raise both tunes by 0.001 for the next ramp.

As per Wolfram: "I suggest two changes for the next ramp:

1. the Blue octupole trim strength in gammat6 from -2 to -3 ;
2. both Yellow tunes in the store stone by $+0.001$, to set points of (31.2513, 32.3621).

Changes implemented by Selam."

Rob Michnoff comments on Yellow stripline kicker for Artus and Gap Cleaner:

1. Left trace is with the kicker off, the middle trace is with the kicker pulsing during gap cleaning, and the right plot is the wall current monitor bucket pattern.
2. Bucket 1 is shown on the left trace at around x-scale 6500, with the abort gap immediately to the left of bucket 1. Note that bucket 4 has no beam left (I'm assuming that this WAS filled for this store) and bucket 7 is very small.
3. The kicker pulse on the middle trace is shown zoomed in - the actual kicker pulse is saturated (the flat line beginning at x-scale 5000). The pulse beginning at around x-scale 6000 is a reflection from the kicker pulse. The position of this reflected pulse coincides with buckets 4 and 7, and therefore conclusively indicates the cause of decreased intensity in these buckets. Bucket 1 is most likely also affected.

4. I understand that Tom Russo is working on a solution to eliminate the reflected pulse. A short-term solution worth considering is to move the Hi Voltage Bhelke switch from the service building to the connector right on the beam pipe. This would shorten the Hi Voltage kicker cable length to near 0 and likely eliminate the reflection pulse.
5. We might be able to shift the selected gap cleaner bucket closer to the last filled bucket, but I'm concerned that while bucket 7 would be improved, bucket 1 would probably be more severely affected. Since the last filled bucket is currently 331, we could try to change the gap cleaning bucket from 337 to maybe 333.

Ramp 9408 (87 bunches per ring) started at 1:09 pm.

1.185×10^{11} deuterons and 1.006×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.2%, Yellow ramp efficiency: 92.0%.

Wolfram comments: No sign of Blue instability on this ramp. We would be ready for more beam. Rebucketing not as good as it used to be.

Beam abort after approximately 45 minutes. Rob Michnoff comments: While on the phone with Paul, Paul changed the Artus bucket from 337 to 333 in attempt to decrease the number of bunches affected by the ringing gap cleaner kicker pulse. While this change was made, I was monitoring the kicker signal on the scope and noticed that just prior to the beam dump, the kicker pulse may have coincided with bucket 331.

Ramp 9409 (87 bunches per ring) started at 2:41 pm.

1.222×10^{11} deuterons and 1.121×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 90.2%, Yellow ramp efficiency: 82.8%.

As per Wolfram: "With the Blue instability out of the way, we could try a few more bunches for the next store (93x93)."

During the evening (as per Jim Jamilkowski):

Between three stores, physics ran for 8.47 hours tonight. The store from the previous shift was dumped at the scheduled time. The following store was aborted due to a b2-dhx trip. CAS swapped out the current regulator card for the power supply and a third store was put up. Luminosity was diminished somewhat due to lingering gold intensity issues in the injectors.

False high temp alarms have been received tonight for the Booster RF mezzanine at building 914.

Ramp 9410 (93 bunches per ring) started at 10:18 pm.

1.202×10^{11} deuterons and 1.010×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.3%, Yellow ramp efficiency: 93.2%.

Here we see losses in blue at transition; our instability has returned. Also poor rebucketing in blue. Wolfram suggests either increasing blue octupole strength in gammat6 further from -3 to -4 , or going back to 87 bunches per ring.

Raising the Blue vertical tune at store by 0.003 improved lifetime in blue and yellow. It also helped backgrounds.

Beam Abort, 4b-time. A dropped Blue Quench at 2:49 am Mon 17 Dec. The QPA has a "Crow" fault. Please consult an expert.

45 Sat 15 Dec

During the day (as per Chris Naylor):

This shift saw brief periods of physics, both at the beginning and at the end. The majority of the shift was in failure as a result of a Permit Link Interlock, an abort kicker problem that had an ensuing Permit Link Interlock and Quench Link Interlock, and an ODH alarm in sector eight at RHIC. BLIP, however, did run all shift.

As per Wolfram:

The last 4 high-intensity ramps (9396, 9297, 9398, 9399) all had a horizontal instability in Blue near transition. The instability set in at 210ms/220ms/188ms/122ms after the gamma-t event, with bunch intensities of 0.99/1.04/0.97/0.97e11 at these times.

There is no large emittance increase visible in the IPM with the Blue instability at transition. At this point we should probably do nothing.

In the current store (9399), the emittances measured by the IPM are 15mm.mrad in Yellow and 10mm.mrad in Blue, giving an average of 12.5mm.mrad. The emittances calculated from the PHENIX ZDC rates and beam intensities are 20mm.mrad (from STAR 30mm.mrad). If the n-pair production cross section for PHENIX were 0.39b (like in Run-3), not 0.52b, the emittances would agree. For STAR we would need about 0.3b. The ratio between the PHENIX and STAR ZDC rates is not constant throughout a store (for all three cases: uncorrected ZDC,

corrected for all singles, and corrected for collision singles only). It would be good to have the latest vernier scans analyzed to confirm (or change) the cross sections for the ZDC rates. We could be underreporting the luminosity by as much as 30%.

Ramp 9400 (93 bunches per ring) started at 8:08 am.

1.100×10^{11} deuterons and 1.128×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 90.5%, Yellow ramp efficiency: 89.4%.

Beam Abort, 8b-ps1 dropped Loss Monitor 1. Losses due to both yellow and blue collimation. Also poor rebucketing.

Ramp 9401 (93 bunches per ring) started at 9:12 am.

1.182×10^{11} deuterons and 0.979×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 84.2%, Yellow ramp efficiency: 90.8%.

Approximately 10% loss in blue around transition.

Beam Abort, 8b-ps1 dropped Loss Monitor 1. Losses due to collimation again?

Ramp 9402 (93 bunches per ring) started at 10:06 am.

1.188×10^{11} deuterons and 1.098×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 83.3%, Yellow ramp efficiency: 88.5%.

Again approximately 10% loss in blue around transition.

Wolfram notes: “Again a coherence signal in Blue horizontal at transition, and again no emittance growth seen by the IPM.”

Vadim comments: “We might have reached those current levels when the survival of bunches on the ramp and at the store depends on the its position in the train. It seems that Blue transition instability affected mostly second part of the bunch train. Blue IPM, probably, looks only at the first part of the train and does not show the emittance blowup. Having many bunches blown up may make difficult Blue collimation too.”

Calculation of the optimum store length (as per Wolfram). “Input parameters were determined from last and this week’s physics stores (up to Friday morning). Luminosity was fitted as usual to a double exponential decay (a 3-parameter fit). Input parameters then are: fraction of fast luminosity decay 23%, time constant of fast luminosity decay 0.58h, time constant of slow luminosity decay 6.51h, average store-to-store time (cut at 12h) 2.5h. Assuming about half an hour from lumi-on until detectors fully

operate, the optimum store length is 5.5h, fairly close to the current 6h.”

Brief summary of collimator actions (as per Angelika):

1. I used S2 and S3 scintillators this time to collimate for STAR and PHENIX. I saw reductions in both backgrounds (STAR and PHENIX).
2. The new blue positions were very different from what was in the database. I also checked the vertical blue crossing angle in PHENIX and this time it's still flat, i.e. close to zero (we zeroed it yesterday). This is likely the reason that the old positions were so far off since they were likely found while a significant crossing angle was in.
3. The new setpoints were saved into blue.
4. I had problems with the nxclient, it kept crashing and then the session hung which is why I couldn't do yellow. We did yellow “on the phone” and brought them to a position that was used during the overnight store.
5. Since we found all positions set to zero in yellow we had to manually overwrite them. We restarted the collimator manager later and saved the new positions. Yellow positions are only marginally different from the old “standard”. After that we restarted the gap cleaner.
6. We should keep watching the vertical crossing angle in IR8 to avoid this problem coming back and haunting us (I had zeroed it already once before, about 1 week ago but yesterday it was back in).

After approximately two hours, store 9402 was brought down by an abort kicker prefire. Yellow abort kicker fired outside the gap. After consultation with Mr. Mi and Leif, it was decided to bring the yellow kicker voltage down from 27 to 26 kV.

During the evening and overnight (as per Nick Kling):

Physics ran for 7.28 hours over two RHIC stores. The first store was extended for an hour due to yet another vacuum leak in the AGS ring. This store was eventually taken down by a bad firing card in a Blue RHIC power supply. The vacuum leak in the AGS occurred in another straight section of beam pipe. This time the location of the leak was at I17, fortunately this leak was able to be sealed with Glyptal vacuum sealant. At the time of the vacuum failure we were tuning Gold beam with AGS

early turn off turned on. We had been tuning in this mode for about 10 minutes before the vacuum blew. BLIP ran for all 12 hours of the shift.

Ramp 9404 (87 bunches per ring) started at 6:16 pm.

1.125×10^{11} deuterons and 1.067×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.6%, Yellow ramp efficiency: 90.2%.

As per Wolfram: Although nice initial rates, we have again a Blue horizontal instability just after transition. As Vadim pointed out, this will affect only bunches at the end of the train. To counteract the Blue horizontal instability at transition we could either increase the Blue horizontal chromaticity at gammat3 from 6.7 to 7.7, or increase the Blue octupole trim strength in both gammat1 and gammat6 from -1 to -2 . Without these instabilities, rates should be even higher. I would go with the octupoles.

As per Nick Kling: There is a leak in the AGS vacuum at I17; this store will have to last until this is fixed.

Beam Abort, 4b-time.A dropped Blue Quench. The QPA has a “Crow” fault. Please consult an expert.

D. Bruno was called. He instructed CAS on the necessary repair work: “I had CAS swap the firing card. I thought the 3 channel iso amp board was the problem. We had a modified one in there but the problem has returned. We had a scope looking at 4 signals but it has not helped me that much so far. I think we may need to look at other signals.”

As per Nick Kling: RHIC power supplies are back up. The AGS vacuum problem has been fixed. CAS is removing LOTO from the AGS.

Ramp 9407 (87 bunches per ring) started at 5:59 am Sun 16 Dec.

1.123×10^{11} deuterons and 1.104×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.9%, Yellow ramp efficiency: 90.2%.

Wolfram’s comments on ramp 9407: The Blue bunch pattern shows systematic variation along the train, the instability may have only affected the emittance. We could further increase the Blue octupole strength at transition (there are no beam losses after transition). To make a smaller change we can go from a trim strength of -2 to -3 in gammat6 only. We only need more stability 200ms after the gammat event.

Yellow has 2 problems. The first 6 bunches have less intensity than the average, probably caused by the gap cleaner. Please contact Angelika or

Rob for changes in the gap cleaner. The second problem is beam-beam effect. Bunches in buckets 214 to 235 have better lifetime because they experience only 1 collision. The Yellow beam loss rate 2.5h into the store is 10%/h, twice as large as we had in good stores. Previously this could be remedied with tune changes.

This is the last tune measurement in Yellow (.224,.234), fairly close to what should be a good tune (.225.235). May be we raise both tunes by 0.001 for the next ramp.

46 Fri 14 Dec

During the day (as per Vincent Schoefer):

The low luminosity store for STAR was put up on this shift. The early part of this shift was dominated by the failure and replacement of an isolation board for a 4 o'clock DX magnet power supply. The latter half of the shift consisted of attempts to ramp higher intensity bunches for physics stores. Those attempts were delayed by efforts to increase the injected intensity by tuning the gold bunch merge and by time spent improving the lifetime of both beams at injection. The ramps were further hindered by a wfg error which ultimately ended in beam losses resulting in a chipmunk interlock and beam losses at the blue collimators which are too high (i.e. above BLM thresholds) on stores with a per bunch injected intensity of about 1.2×10^{11} deuterons. As of the end of the shift an 87x87 bunch store is in RHIC.

Ramp 9398 (87 bunches per ring) started at 6:26 pm.

1.090×10^{11} deuterons and 1.037×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.8%, Yellow ramp efficiency: 90.6%.

Note that after fill 9393, the vertical store stone tune was increased by 0.005. This change was left in. An increase of 0.008 had been suggested by Wolfram.

During the evening and overnight (as per Nick Kling):

I moved the Yellow vertical tune up the final .003 that Wolfram has suggested. Beam lifetime took a little hit. We will see how it looks when the next store (9399) starts. Note the even spacing of all four tunes as measured by HFTunes.mon (Blue QH = 0.237; QV = 0.228. Yellow QH = 0.223; QV = 0.233).

Ramp 9399 (87 bunches per ring) started at 1:12 am Sat 15 Dec.

1.112×10^{11} deuterons and 1.141×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.1%, Yellow ramp efficiency: 89.7%.

Phenix ZDC rates = 100 kHz.

The Blue vertical collimators were in way too far. The first spike is from moving V0 in one step. The second end enormous spike is the V1 collimator moving in one step. I have backed both of these out significantly because moving them out did not hurt the backgrounds at all. These new setting have been saved. I think we will be good to try more beam or bunches on the the next ramp without risk of another collimator attack.

Yellow tunes stayed pretty much were we left them at the end of last store (9398). Yellow lifetime did not improve, but it did not get any worse from the large vertical tune change.

47 Thur 13 Dec

During the early morning (as per Nick Kling):

Physics ran for 6.33 hours on two 87x87 bunch stores. Between these stores there was one ramp attempt that failed due to a loss monitor interlock that was likely the result of problems experienced cogging the beams. There were no such problems cogging on the ensuing ramp attempt and the store went up smoothly and remains in the machine as of the shifts end.

BLIP ran for all 8 hours of the shift without interruption.

Ramp 9385 (87 bunches per ring) started at 1:46 am.

1.035×10^{11} deuterons and 1.067×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 90.5%, Yellow ramp efficiency: 90.7%.

During the day (as per Vincent Schoefer):

This shift was largely dedicated to developing the low beta* ramp (dAu81). Fifty-six bunches per ring were ramped to top energy and preliminary work towards establishing operational store conditions was accomplished. Collisions were established in both rings and beam lifetime was significantly improved. As of the end of the shift we have reverted to dAu80 and ramped 87x87 bunches to top energy.

Notes to operations: The RF group needs a period of ten minutes with no

beam in the AGS to repair the L10 ENI in the L18 house. I. Marneris needs one half hour with no beam in the AGS to disconnect the B03 compensation quad power supply cables from the supply. This can be done from the B18 house. L. Ahrens should be on hand to examine the effect of this change on beam in the AGS. The alarm for the closed isolation valve in bi9-tmp-pi21 has been acknowledged and can be ignored.

As per Kip:

Machine development with reduced beta-star lattice in yellow (ramp dAu81). Attempted to do new feedback ramp in yellow using feedforward from yesterday's replay ramp. This failed, so we went back to replay. Then did ramp with 6 bunches per ring which survived to flattop. Vadim did orbit correction, tune adjustment, and coupling correction at store. Todd tried to do local decoupling in IR8. Chromaticity measurement was attempted.

Then did ramp with 56 bunches per ring which survived to flattop and had very good transmission in yellow (95.6%). Horizontal and vertical emittances (normalized) of 19.4 and 20.1 π mm milliradians were measured at store. Yellow lifetime initially was not particularly good (20% per hour decay rate), but this was improved by adjusting tune and chromaticity. Brought beams into collisions at IP6 and IP8 and collimated.

New ramp (dAu81) with reduced beta-star in yellow.

Ramp 9390 (56 bunches per ring) started at 3:12 pm.

0.894×10^{11} deuterons and 0.702×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.1%, Yellow ramp efficiency: 95.6%.

Reverted back to ramp dAu80 to put up Physics production stores.

During the evening and overnight (as per Jim Jamilkowski):

Physics ran for 10.97 hours between two stores. BLIP ran all shift.

As per Kip:

Wolfram Fischer has done a careful analysis of the tunes in blue for all Physics stores so far this run (see 18:04 entry in the Thu-Dec-13-2007 rhic-dau-2008 elog). He suggests that vertical tune in blue should be raised by 0.005 at store stone. This was attempted for ramp 9392 after beam had been ramped to store. Moving the vertical tune in small steps only made the blue lifetime worse. For the next ramp (9393), the shift of 0.005 was put in the store stone before ramping with beam. **This dramatically increased the blue lifetime at store, although yellow lifetime suffered**

somewhat.

(Back to ramp dAu80).

Ramp 9392 (87 bunches per ring) started at 6:36 pm.

1.107×10^{11} deuterons and 1.140×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.8%, Yellow ramp efficiency: 86.4%.

For this ramp (9392) Wolfram notes that “Blue lifetime at injection is again affected by Yellow beam”.

Ramp 9393 (87 bunches per ring) started at 1:53 am Fri 14 Dec.

1.129×10^{11} deuterons and 1.071×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.2%, Yellow ramp efficiency: 91.8%.

48 Wed 12 Dec

During the early morning (as per Nick Kling):

Physics ran for 4.25 hours on a single store. This store was cut short to allow the start of the APEX session. As of the end of the shift APEX is underway and on schedule. BLIP was off for just over 2 hours due to a problem with the SCR control board for LINAC mod2.

Instructions from Christoph to change yellow gamma-t setting:

For ramp 9371, please increase the yellow gamma-t delay by 1 millisecond: RampEditor – StepstoneEditor – Stepstones (pull-down menu) – gamma-t settings – yellow. I believe it’s now set to –17 msec. Please increase by one millisecond, to –18 msec.

Ramp 9371 (87 bunches per ring) started at 12:20 am.

0.975×10^{11} deuterons and 0.988×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.0%, Yellow ramp efficiency: 95.1%.

During the day (as per Vincent Schoefer):

Accelerator physics experiments ran throughout the shift. The RF group discovered that the gap volts on the L10 cavity have been slowly dropping over the course of the last few days and will need about fifteen minutes without beam in the AGS to effect repair.

Note to operations: The F03 AGS vacuum pump needs to be repaired and should remain off until notice from the vacuum group.

During the evening (as per Jim Jamilkowski):

APEX ran late for a total of 2.95 hours, promptly followed by physics for 4.85 hours. (APEX included work on new ramp dAu81 which has reduced beta-star in yellow. At conclusion of APEX we reverted back to ramp dAu80.)

The ENI for the L10 RF station will be repaired during the daytime tomorrow.

Note to Operations: Should the AGS L10 RF station crowbar, a Ring access will be needed to clear the problem.

Ramp 9383 (87 bunches per ring) started at 5:58 pm.

1.002×10^{11} deuterons and 0.990×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.7%, Yellow ramp efficiency: 90.6%.

49 Tue 11 Dec

During the early morning (as per Nick Kling):

Physics ran for 6.33 hours on two 87x87 bunch stores. There was a 45 minute delay in putting up the latest store due to multiple minor problems with the AGS Rf on the gold setup. Aside from this there were no other problems to report on this shift.

BLIP ran for all 8 hours of the shift.

Increased deuterons per bunch.

Ramp 9367 (87 bunches per ring) started at 3:25 am.

1.01×10^{11} deuterons and 1.03×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.3%, Yellow ramp efficiency: 88.2%.

During the day (as per Vincent Schoefer):

This shift was largely dedicated to the development of linear optics corrections and the low beta* RHIC ramp. Behind the development of the ramp, accesses to the STAR and PHENIX IRs and the RHIC RF area were made. The RHIC storage cavity BS1 QEI was repaired and restored to operation. As of the end of the shift, electricians are investigating a problem with a 110V breaker panel at 1002B.

Todd's assessment of his optics corrections work so far:

“I’m looking over the difference orbits that I took earlier with the ORM corrections in place in today’s shift. In comparison to last week’s data with the same correctors, I am not seeing as much improvement as was noted in the elog. Today’s shift was a success in the sense that I did apply a correction gracefully, and it seemed to improve things, but quantifying the improvement really should be done with good optics measurements and several more difference orbits, as well as a dispersion check. Hopefully Mei and I will be able to accomplish this tomorrow morning, but be aware that I’ll keep running simulations to see if there are any better solutions, and that the success is a bit softer than was observed in the logbook.

Clearly more work to be done here, but it’s good progress nonetheless.”

During the evening (as per Jim Jamilkowski):

Physics ran for 6 hours through one store. As of the end of the shift, an access for PHENIX and STAR experimenters is underway.

Note to Operations: Zeno has reenabled the AGS gamma jump on both users, yielding smaller bunch lengths.

Ramp 9370 (87 bunches per ring) started at 3:55 pm.

1.03×10^{11} deuterons and 0.957×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 89.1%, Yellow ramp efficiency: 81.9%.

50 Mon 10 Dec

During the day (as per Vincent Schoefer):

Physics ran for 3.72 hours between the two stores.

Increased deuterons per bunch.

Ramp 9365 (78 bunches per ring) started at 12:31 pm.

0.805×10^{11} deuterons and 0.995×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 90.4%, Yellow ramp efficiency: 90.9%.

At 3:01 pm store 9365 was aborted by a loss monitor permit interlock from 8b-ps1. Blue and Yellow BLAM 90% of hourly limit alarms came in, which required holding off injection into RHIC for one hour.

During the evening (as per Jim Jamilkowski):

Physics ran for 4.0 hours between two stores. The store from the previous shift was aborted due to a fast beam loss that occurred for an unknown

reason. RHIC could not be refilled immediately due to reaching the BLAM 90% beam loss threshold and due to the loss of the primary reset for the AGS South Wiring Tunnel Target Building Gate. Injection into RHIC resumed after the latch was adjusted for the gate, though the bunching in Yellow was less than desired. Mode switching to deuterons and back to gold seemed to clear the problem.

Power supply bo6-octf is showing a frame error, PSI primary link error, and I/O difference alarm that will not clear.

Note to Operations: If beam is extracted to the W dump continuously, please have HP perform a survey outside of the buffer area that has been erected outside of WGE2 as has been requested by K. Brown.

Increased number of bunches.

Ramp 9366 (87 bunches per ring) started at 7:49 pm.

0.767×10^{11} deuterons and 1.043×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.0%, Yellow ramp efficiency: 85.5%.

51 Sun 9 Dec

During the day (as per Brian van Kuik):

Physics ran for 12 hour this shift in a store that began at the end of the previous shift. An AGS Main Magnet over temperature interlock, which required an AGS Ring access to reset a klixon and a Booster corrector power supply hardware controller, prevented us from ending the store at the normal dump time. The AGS Main magnet klixon reset was on the A6 magnet's number 4 coil, which Pumproom personnel came in to check the flow of the magnet in injection CO2 into the coil to clear any blockage of cooling water flow in the coil. This increased the number 4 coil's flow from 1.6 gpm to 1.9 gpm. The other three coils measured 1.9 to 2.2 gpm. After restoring beam to AGS Extraction in preparation for another RHIC Store, problems controlling Booster Stopband corrector power supplies reduced the Injector efficiencies. Hardware Controls personnel came in and he is currently working with CAS assistance to replace a euro-crate chassis for the Stopband corrector power supplies. BLIP ran all shift.

During the evening and overnight (as per Nick Kling):

RHIC physics ran for 10.18 hours on three 78x78 bunch stores. There were no failures of note for this program on this shift.

BLIP ran for 9.43 hours. There was 2.57 hours of downtime due to a failed blower motor in LINAC mod2.

Ramp 9363 (78 bunches per ring) started at 8:48 pm.

0.606×10^{11} deuterons and 1.03×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.7%, Yellow ramp efficiency: 87.3%.

Ramp 9364 (78 bunches per ring) started at 3:25 am Mon 10 Dec.

0.624×10^{11} deuterons and 0.999×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.3%, Yellow ramp efficiency: 88.3%.

52 Sat 8 Dec

During the day (as per Brian van Kuik):

Physics ran for 10 hours this shift with 2 hours of Experimenter Setup for the Star Detector. While RHIC was at store and Experimenter Access for Star experimenters ran, work inside the AGS ring to repair the vacuum leak at the J-17 straight section. The beam pipe has been replaced, but Vacuum personnel are still working on getting the vacuum sector (between J13 and K3) pumped down. Currently, Vacuum personnel are swapping pumps to see if the pump for the sector is bad and preventing the vacuum sector from pumping down.

During the evening and overnight (as per Chris Naylor):

Vacuum personnel successfully completed the work at J-17 in the AGS this shift. RF personnel came in to bring on the RHIC RF cavities and STAR personnel performed work on their Barrel Calorimeter. Support personnel had to make an access into RHIC to perform power supply work. BLIP ran all shift. As of the end of the shift a 78x78 bunch store has been put up for the experimenters in RHIC.

Ramp 9362 (78 bunches per ring) started at 6:02 am Sun 9 Dec.

0.634×10^{11} deuterons and 0.966×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.8%, Yellow ramp efficiency: 87.2%.

53 Fri 7 Dec

During the day (as per Jim Jamilkowski):

Physics ran for 10.08 hours between two stores. After the second one began, a vacuum leak developed in the AGS Ring between the J13 and K03 valves. As of the end of the shift, J. Barry and M. Candito are in to start leak checking the area.

Flag WF3 will not plunge and will need a tunnel access to repair.

Notes to Operations: If there should be a problem inserting the stochastic cooling equipment, please dump a picture of the application into the elog before any attempts are made to clear the problem (ie. hitting the insert button). Should you attempt to reboot cfe-4a-rfy3, you will be warned to check on the status of Yellow stochastic cooling and possibly restart the tape sequence. The AGS gamma jump has been turned off on both active users due to the controller problems that have since been cleared.

Ramp 9357 (78 bunches per ring) started at 7:31 am.

0.601×10^{11} deuterons and 0.872×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.7%, Yellow ramp efficiency: 93.5%.

Starting at 12:47 pm, Angelika Drees did vernier scans for Star and Phenix.

Phenix then took some zero field data.

Beam dumped at 3:15 pm.

Mike Brennan: "The Yellow Landau cavity will go on for this next ramp (9358). It turns on after transition and turns off just before rebucketing."

Ramp 9358 (78 bunches per ring) started at 4:11 pm.

0.623×10^{11} deuterons and 0.995×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 95.3%, Yellow ramp efficiency: 89.0%.

Store dumped at 17:05 Sat 8 Dec.

During the evening and overnight (as per Chris Naylor):

RHIC Physics ran for the entire shift. The store dump time was extended past the original time of 22:15 yesterday evening as a result of a vacuum problem in the AGS. Personnel are currently in to begin repairs on the vacuum problem in the J Superperiod. BLIP tripped off several times this shift due LINAC RF Mod trips. As of the end of shift the 78 bunch store from yesterday continues in RHIC.

54 Thur 6 Dec

During the early morning (as per Chris Naylor):

There were many problems this shift. Initially we had a fault with the Blue Main Dipole Power Supply in RHIC for which personnel had to be called in to resolve. Then the Siemens MG Set tripped as a result of a Flow Switch problem; personnel had to be called in for that as well. The Booster Main Magnet Power Supply tripped on an Emergency Crash and Tandem had a cryo baffle close. We did try to ramp twice, but we lost the beam both times due to loss induced Permit Link Interlocks. We did finally put up a 78 bunch store for Physics that continues as of the end of the shift. BLIP ran all shift.

Ramp 9351 (78 bunches per ring) started at 5:44 am.

0.647×10^{11} deuterons and 0.986×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 92.6%, Yellow ramp efficiency: 93.0%.

During the day (as per Jim Jamilkowski):

Physics ran for 3.3 hours in the store inherited from the previous shift. RHIC ramp chromaticity and store dispersion measurements were then performed as part of machine development. As of the end of the shift, over two ramp attempts the store stepstone settings were reverted to those from fill 9332. Yellow beam lifetime after cogging appears to be much improved on the latest attempt.

During a RHIC access today, a limit switch problem for the Yellow right kicker tank 2 was repaired, as was the tuner for storage RF station YS2.

The Booster horizontal chromaticity power supply is intermittently showing false security interlocks.

D. Bruno reports that the cluster interlock has been jumpered out for the warc20 power supply, so that the supply will no longer trip (though a load fault alarm will still be generated). A PLC input module has also been replaced. If load fault alarms are received for the supply, then the input module was not the cause of the recent interlocks and further troubleshooting will likely be required.

Ground fault indications from substation 8B have ceased since non-functioning A/C unit 4 for the PHENIX IR was locked out.

Notes to Operations: If the warc20 power supply shows a load fault indication, please leave a message for D. Bruno at his lab phone extension

and have CAS make an entry in their elog. The supply won't trip in this state since the fault has been bypassed. L. Ahrens has left instructions for taking a set of W line flag profiles.

Ramp 9354 (78 bunches per ring) started at 5:32 pm.

0.605×10^{11} deuterons and 1.02×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.9%, Yellow ramp efficiency: 94.2%.

Ramp 9355 (78 bunches per ring) started at 6:48 pm.

0.608×10^{11} deuterons and 1.02×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 91.8%, Yellow ramp efficiency: 88.2%.

During the evening and overnight (as per Nick Kling):

Physics ran for 7.93 hours with two 78x78 bunch stores. The first store was lost prematurely due to a PASS failure of the gate loop in sector 1Z1 of RHIC. Repair of this problem required a ring access in order to replace the micro-switches on the 1GE1 access gate. There was an additional delay as we were unable to bring two of the Blue Rf storage stations back on after the access was complete. While we were waiting for Rf technicians to arrive we attempted a ramp with only the one remaining Blue storage cavity on. This store had no issues during rebucketing and the collision rates were much higher than on previous stores. This store survived well for the full nominal 6 hour period and as of the end of the shift the experiments are powering down and getting ready for another fill.

BLIP ran for all twelve hours of the shift.

Ramp 9356 (78 bunches per ring) started at 0:39 am Fri 7 Dec.

0.614×10^{11} deuterons and 0.993×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.6%, Yellow ramp efficiency: 94.1%.

55 Wed 5 Dec

During the early morning (as per Chris Naylor):

Accelerator Physics ran for the majority of the shift. There was a brief interruption at the beginning of the shift due to a problem with the BtA Foil Drive System. Accelerator Physics was cut short at the end of the shift because of a Permit Link Interlock in the blue ring. As a result, today's Scheduled Maintenance was started early. BLIP continues to run

as of the end of the shift.

During the day (as per Jim Jamilkowski):

Scheduled maintenance continued for the entire shift. Beam Components and Instrumentation personnel successfully replaced a bound wobble stick that was preventing the BTA foil mechanism from moving. As of the end of the shift, Booster and AGS LOTO is being removed.

Maintenance summary from Paul Sampson:

Today's maintenance went well for the most part. There were several complications that caused delay: First the failed BTA foil drive from last night extended the Booster access and therefore recovery. Further delay was caused when a major job was started late in the day. The parts for a failing breaker at the 929 RF Main Power Panel had not arrived until this afternoon and, because of a rise in temperature in this breaker, it was decided to extend the maintenance until this could be repaired. Due to the fact that this job would require shutting down all of the AGS RF, the RF Cooling and Air Conditioning systems in 929 as well as the AGS MMPS, there were several hours of lead and recovery time. The total delay was about 3 hours. Thirdly, a job performed today on V118-10A-BLM2 caused some problems. The test on this device did not show a permit problem until a "Permit Reset" was attempted. RHIC remained off as a result. Instrumentation personnel needed to be called back in to undo this modification. While en route, CAS was able to clear the problem with telephone assistance. Instrumentation checked the system upon arriving, shortly after the fix. This will need to be further addressed tomorrow. In the mean time, we did a mode switch to deuterons to check for any other complications. This went well and as of 1851, Deuteron tuning in the AGS was under way. In summary, the Booster and AGS were on by 1700 and RHIC was ready for beam by 1900. Beam was circulating in the Blue and yellow rings ring by 1930.

During the evening (as per Nick Kling):

Scheduled maintenance ran for the first 5 hours of the shift. We have been unable to return to a physics running mode due to an emerging problem with the Blue main dipole power supplies. This supply worked fine on every hysteresis ramp and on the one 6x6 bunch test ramp but has failed on the two attempts we have made at physics stores. As of the end of shift power supply personnel are coming in to fix this problem.

56 Tue 4 Dec

During the early morning (as per Chris Naylor):

Physics ran with three stores this shift. The first was a 78 bunch store that was inherited from the previous shift which was dumped on time. The second was an 87 bunch store that was dumped early because of high backgrounds at STAR. The third, which is currently in the machine, is an 87 bunch store which is also producing high backgrounds at STAR. STAR, however, elected to keep this store. MCR tried to mitigate the backgrounds at STAR for the last two stores but was unsuccessful. As of the end of the shift, beam is unavailable from Tandem while they troubleshoot a radiation safety system problem.

Ramp 9326 (87 bunches per ring) started at 1:36 am.

0.719×10^{11} deuterons and 0.881×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 93.4%, Yellow ramp efficiency: 93.6%.

Ramp 9327 (87 bunches per ring) started at 3:54 am.

0.609×10^{11} deuterons and 0.768×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.0%, Yellow ramp efficiency: 92.8%.

During the day (as per Jim Jamilkowski):

Physics ran for 4.27 hours between two stores. The end of the first store was used to test the Blue BBQ as a tool to increase the emittance of the deuteron beam (for the purpose of matching emittances with that of the gold beam). The subsequent ramp attempt failed due to excursions by the b-dmain power supply that caused a QLI. C. Schultheiss has captured data from the trip that he will use to work on the b-dmain supply during tomorrow's maintenance. After recovering from the QLI, a store was started with 78x78 bunches for the experiments.

Ramp 9329 (78 bunches per ring) started at 12:24 pm.

0.581×10^{11} deuterons and 0.739×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.1%, Yellow ramp efficiency: 94.5%.

During the evening (as per Nick Kling):

Physics ran for the first half hour of the shift. This store was lost due to permit interlock from the PASS system. This failure caused the official start of start of the machine development period to be moved up by 20 minutes. Unfortunately this early start did little good for the success of

this development time. Before any progress had been made development was halted for another 1.5 hours due to a failure of a front end computer in RHIC. Once this was resolved a problem arose with the driver for the YA1 Rf station. This problem required a ring access to repair and was wrapped up right as the APEX session was scheduled to begin. Even with the timely repair of the Rf station, the start of APEX was delayed by 40 minutes by a quench link interlock caused by the y2-q89 power supply. APEX then ran for all of 10 minutes before the BTA foil drive controls stopped working and caused the gold beam to be unavailable for the remainder of the shift. As of the end of the shift experts are still working on the BTA foil control but it looks like a temporary solution has been reached to allow APEX to run throughout the evening.

BLIP ran for the final 8.5 hours of the shift.

Early in the evening, Vadim and Kip did an incomplete study of effect of larger emittance deuteron beam on gold survival in yellow. This will need to be revisited.

The plan was to put in 59 bunches per ring with $1e11$ d and 0.6, 0.8, $1.0e9$ Au ions per bunch. Introduce BBQ noise for several minutes (to increase d bunch emittance) before separation are collapsed for collisions.

While setting up for 1.0×10^9 gold ions per bunch, we find that we can get up to 1.4×10^9 gold ions in RHIC at injection.

Ramp 9332 (59 bunches per ring) started at 6:31 pm.

0.991×10^{11} deuterons and 0.765×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 87.6%, Yellow ramp efficiency: 95.3%.

QLI in yellow at 7:22 pm.

57 Mon 3 Dec

During the day (as per Jim Jamilkowski):

Most of the shift was spent on taking Yellow dispersion and Orbit Response Matrix measurements after a flow switch problem for the Siemens rectifier was rectified. As of the end of the shift, Quench Protection System specialists are investigating a Blue quench protection switch problem that triggered a QLI.

The AGS A5 injection kicker timing is drifting generally earlier due to an

issue with tube A. D. Warburton is monitoring the situation. The A5 fine delay has been changed twice today to compensate. Next time we switch to deuterons, it is expected that the A5 delay will need to be lowered by 150 ns.

Note to Operations: After each Blue QLI: if the 6000A Quench Protection switches are found to be responsible, notify Don Bruno of the situation before continuing. If something else caused the QLI, have CAS go out to 1010A to reset both scopes that are monitoring the QPS's. CAS has been given instructions on how to find the equipment.

As per Todd Satogata:

Accomplishments:

1. 10Hz IR feedback was turned off.
2. Put in a 6-bunch store, and tried yo12-ql2 trim to improve yellow dispersion. This made dispersion somewhat worse, and did not have the right magnitude, so it was removed.
3. Fairly extensive analysis of colliding bunches in recent stores by Angelika and Wolfram.
4. Yellow ORM measurements were taken for about 60 horizontal correctors. Script timeout problems resulted in a late start. This is about 25-30% of the total ORM desired to get a complete data set for both beams. This activity was ended prematurely by a trip of the B9DQPSW quench switch in 1010A.
5. During the downtime, Mike Blaskiewicz, Mike Brennan, and John Butler looked for noise sources in yellow RF. None were found.
6. We set up a 59-bunch test ramp with many things off (see 16:10 entry), and selectively turned things on during the ramp. Yellow beam decay and debunching stayed low until we put the beams in collision. Consistent emittance measurement behavior was seen between the IPM and HF Schottky. Inserting collimators spiked beam decay, and starting gap cleaning late aborted the beams, with 90% blue and 50% yellow BLAM alarms.
7. Possible suggestions for future stores:
 - (a) Move beams into collision transversely instead of longitudinally (make remove/restoreSeparation work).

- (b) Blow up deuteron beam emittance to limit beam-beam effects on yellow beam.
- (c) Lower blue intensity and raise number of bunches.

During the evening (as per Nick Kling):

Physics ran for the the final 3.75 hours of the shift. This store was much improved in Yellow lifetime lifetime over what has been experience over recent days. To accomplish this **we lowered the Deuteron intensity by 40% and increased the number of bunches to 78x78. Although this is the first attempt at this approach the results are very promising.** The first several hours of the shift were used to study the effects of turning on the various systems used at store to see what impact they had on the beam lifetime. This effort was ended prematurely when efforts to turn on gap cleaning after several hours at store caused a loss monitor permit interlock.

Blip ran for 8.27 hours

Ramp 9325 (78 bunches per ring) started at 7:00 pm.

0.609×10^{11} deuterons and 0.871×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.3%, Yellow ramp efficiency: 91.0%.

58 Sun 2 Dec

During the day (as per Vincent Schoefer):

Most of this shift was dedicated to making nonlinear chromaticity measurements and corrections to the yellow ring at store. These corrections did not improve the beam lifetime and so were not applied. The return to physics was delayed by a quench link interlock of the blue ring likely caused by a hysteresis problem associated with ramping with the wrong slow factor. As of the end of the shift we are ramping a 59x59 bunch store to top energy for physics.

Ramp 9315 (59x59 bunches) started at 9:15 am.

1.03×10^{11} deuterons and 0.935×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 85.7%, Yellow ramp efficiency: 90.5%.

Ramp 9319 (59x59 bunches) started at 6:57 pm.

0.997×10^{11} deuterons and 0.938×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 86.7%, Yellow ramp efficiency: 91.7%.

Mike Brennan did a test in which stochastic cooling was turned off for part of store 9315. He found no change in loss rate when cooling was turned off. Cooled beam remained in bucket. This is a puzzling result.

As per Thomas Roser:

“Average bunch lengths over the last few store with stochastic cooling on for the most part. First store had stochastic cooling off. Last store had stochastic cooling off (with kickers still in) for the last couple of hours. Note that during the first store the bunch length just saturates at the bucket length. At the last store, however, the bunch length continues to shrink even after stochastic cooling is off. This is a puzzle to me. Maybe the stochastic cooling kicker is both a betatron and momentum aperture and as the beam grows the momentum spread gets shaved. This would be enhanced if there is a large amplitude dependent dispersion. There are reports from the experiments that claim a possible increase of background with stochastic cooling. It is also strange that blue (d) bunch length grows in all case, while in bunch length in yellow stays constant without stochastic cooling.”

During the evening and overnight (as per Chris Naylor):

Physics ran with two stores this shift. The first store was dumped about 30min early because of low experimental collision rates, and the second ended prematurely as a result of a quench link interlock in the yellow ring. As of the end of the shift we are being held off by an AGS water flow problem in the basement of bldg 928.

Notes: The Booster b-chromh-ps has been tripping intermittantly on a “Fault, Security Interlock Remote” fault and a “State mismatch” fault. The faults come in briefly, then clear. This problem should be looked into during the day.

Ramp 9320 (59x59 bunches) started at 1:33 am 3 Dec.

1.05×10^{11} deuterons and 0.978×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.5%, Yellow ramp efficiency: 90.9%.

59 Sat 1 Dec

During the day (as per Nick Kling):

A single store with rather poor rates remained in RHIC for the final 10.5 hours of the shift. This store was originally scheduled to be dumped two

hours early but was forced to be left in the machine due to a magnet temperature interlock in the AGS. After 6 hours of investigation it was determined that there was in fact no actual temperature problem in the A7 main dipole. It appears that the trips of the AGS main magnet power supply were due to glitches in the temperature sensing system. The cause of these glitches is still not determined. As of shifts end the AGS is back up and we are finally beginning preparations for a new store.

Blip ran for 4.71 hours. The program was off for the rest of the shift but we were unaware of this due to lack of any audible or ADT alarm.

Ramp 9312 (59x59 bunches) started at 8:22 am.

0.987×10^{11} deuterons and 1.04×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 88.0%, Yellow ramp efficiency: 90.5%.

During the evening and overnight (as per Brian van Kuik):

Physics ran for 9.3 hours this shift with 2.4 hours of Machine Setup. There was 0.3 hours of downtime while Tandem reset a charging circuit for the deuteron source.

Notes: **F. Severino was contacted twice to watch the insertion of the Yellow Stochastic coolers.** The separation bumps in IR2 were put back in at store by T. Satogata.

Ramp 9314 (59x59 bunches) started at 2:07 am 2 Dec.

0.897×10^{11} deuterons and 0.966×10^9 gold ions per bunch at injection.

Blue ramp efficiency: 94.2%, Yellow ramp efficiency: 93.6%.