RHIC 2009 250GeV Run Plan

- 2/6/2009: Blue injection setup
  - Circulating beam in Blue with snakes off : EVE+OWL shift
    - Preparation for the injection
      - Set beam sync clock to reference if it is at synthetic
      - Set main dipole trim and dipole correctors from RUN08 value. But zero the snake bumps
      - Restore the RHIC configuration to RUN08 setting. This includes
        - Injection kicker timing and voltage
        - RF parameters in RF DSP page. But set the path length offset to zero for snake off case. This should automatically set the cavity frequency about 30 Hz higher. This means with the same field at injection, ~+1mm radius off center is expected.
        - Instrumentation timing. We do expect timing adjustment once beam is captured with the current LLRF system
      - Get beam in for 1st turn at injection with corrector at bo6-tv9 set to 1.3mrad to optimize the AtR injection setup
    - preliminary bpm timing: Todd
    - Injection kicker timing: Wolfram
    - Orbit correction and tune adjustment based on RhicInjection to achieve circulating beam
    - Exam the average orbit. If the average orbit is considerably off-center
      - Check the total sum of all correctors' strength. Minimize the contribution of correctors to the path length first. And then scale the dipole trims to bring beam to center
    - minimize the beam loss

- orbit correction and optics adjustment including de-coupling based on the tune measurements as well as coupling measurements by RhicInjection application

- 2/7/2009
  - RF capture in Blue ring(RF group): DAY(2/7)
    - Start setup with the current low level RF and 28 MHz cavity.
    - Switch RF capture to 9MHz cavity
  - Snake bpms beam based alignment: 2 hours EVE shift
  - Re-establish circulating beam with snakes on: EVE+OWL shift
    - Power supply group continues on their work on the Yellow power supplies in parallel
    - Re-exam the timing of the BPMs
    - Restore the path length offset(4160) for the RUN08 operation to the RF parameter on DSP page. This should change the cavity frequency to 28128770Hz.
    - Turn on snake bumps. Check RHIC recipe book for the snake bump settings
      - S=1150m, -9 mm
      - S=1180m, -10mm
      - S=3050m, 11mm
      - S=3080m, 7mm
    - Optics correction and orbit correction to improve beam lifetime
    - Unmask snake blms
    - Turn on snakes with LOW intensity bunch ONLY. Check RHIC recipe book for the snake current setting
      - Outer Snk7.1-4: 100A
      - Inner Snk2.3-3: 323A
    - Optics correction and orbit correction to improve beam lifetime
    - Inject bunch with normal intensity to check the beam lifetime.
- 2/8/2009: Instrumentation setup

- Instrumentation setup: DAY+EVE+OWL
  - BPM, IPM, Artus(make sure the FFT is between 0.5 and 1.0)…
  - Critical systems: BBQ and Blue CNI polarimeter
- Injection tuning:
  - Orbit optimizing
    - Double check the correctors with large strength
    - Global rms and local orbit at snakes
  - Optics tuning
    - Working point: (0.695, 0.685)
  - Decoupling to dQmin~0.001
  - Chromaticity ~ +2 with good beam lifetime

- 2/9/2009: Yellow Injection Setup
  - Power supply work including DX and Yellow snake training:
  - Establish circulating beam with snakes off: 1.5 shift
    - Similar steps as in Blue injection setup: establish circulating beam with snakes off
  - RF capture: 1.5 shift
- 2/10/2009-2/12/2009:
  - Establish circulating beam with snakes on: 2 shift
    - In parallel, Blue injection working including continuing Blue instrumentation setup
    - Spin rotator training can also be parallel
  - Instrumentation setup: 2 shift
    - BPM, IPM, Artus, etc.
    - Critical system: BBQ and CNI polarimeter(Haixin, Anatoli, Mike, …)
    - Injection optimization in parallel
  - In parallel, Blue RF setup for ramp development

- Tune/coupling feedback setup for ramp development, 1 shift per ring: Yun, Al, Joanne, BBQ experts, …
  - This can be taken place in between the RF setup with 9MHz
- Polarization setup
  - Scan H orbital angle between snakes and measure polarization
  - Minimize H orbital angle between snakes and snake current scan

- 2/13/2009 – 2/24/2009: Ramp development
  - ramp both beams to store: 2/13-2/15
    - 6x6(or 12x12) bunch with nominal bunch intensity
    - tune/coupling feedback loop on
    - orbit correction and optics adjustment including chromaticity correction
  - improve ramp efficiency: 2/16 – 2/18
    - orbit correction and optics correction including chromaticity
    - non-linear correction: 1 shift for both rings
    - RF setup at store with current LLRF
    - Polarimeter setup at store
    - Polarization ramp measurement
    - increase the number of bunches. Goal is 111x111
  - store setup: 2/19/2009 -- 2/22/2009
    - Steering for collision
    - Rebucketing with 28MHz setup
      - Estimate of time: ~12 hour shift.
    - orbit correction and optics correction
      - optimize the H orbit angle between snakes
    - polarization setup
      - polarization ramp measurement

            - optimize H orbital angle between snakes, measure beam polarization as function of snake orbit angle scan at store
    - Ramp/Store optimization: 2/23 – 2/24
        - Collimation setup:
            - possibility of providing collision overnight
        - Optimize ramp to increase bunch intensity
        - Polarization optimization
            - Polarization ramp measurement
            - Snake orbital angle scan
            - Spin tune measurement
- Deliver collisions
- Rotator ramp development: 2 DAY
    - Ramp development
    - Store setup including vernier scan