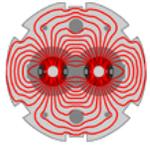




Accelerator Systems Observations

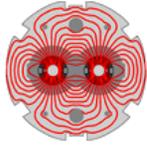
Steve Peggs

Goal: Technical, Cost, & Schedule plan for FY06 & 07
DOE review June 1 & 2



LARP

Instrumentation



LARP

Existing Tasks

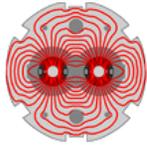
Reviews:

- **Tune Feedback** last week successful (+ caveats)
- **Luminosity Monitor** review next Mon & Tues

RHIC as test bed

- Beam-Beam compensation wires (**PROPOSED**)
- Schottky
- Tune Feedback
- electron cloud monitoring
- ZDC's

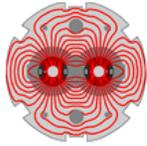
LARP needs a systematic discussion with C-AD management, including commissioner names, presumed funding, etc...



LARP

New proposal: Schottky

- Schottky would be **only tune measurement during store!**
- Enables **multiple bunch tune & emittance measurements**
- **Beam-beam, ecloud, impedance studies**
- Interest from Tanaji Sen, JP.Koutchuk, Frank Zimmerman, ...
- It is relatively inexpensive (~1FTE year + \$25k + travel)
- Connection to AP exploitation here and elsewhere ...

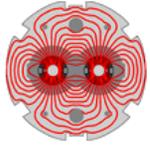


LARP

Proposed Schottky Milestones

FY06	FNAL	S/ N study of low intensity bunches in Tevatron
FY06	FNAL	Design pick- up structure
FY06	BNL/ FNAL	Study PLL DAB board for DAQ
FY06- 07	FNAL	Design and build front- end electronics
FY06- 07	FNAL	Adapt Fermilab analysis software
FY07- 08	FNAL	Hardware commissioning at CERN (w and w/ o beam)
FY07- 08	FNAL	Beam studies (e.g. chromaticity, ramp)
FY07- 08	LARP	Non- destructive average tune , emittance, momentum spread and chromaticity measurement capability
FY07- 08	LARP	Non- destructive bunch- by- bunch tune , emittance, momentum spread and chromaticity measurement capability

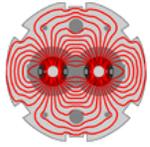
Ultimate goals in black



LARP

Teams !!

- across US labs
- across the atlantic (eg Tune Feedback!)
- across “discplines” (exploitation)



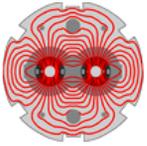
LARP

Accelerator Physics

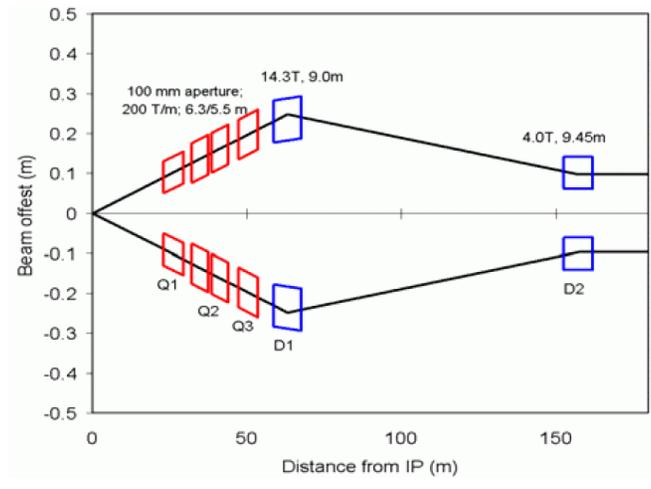
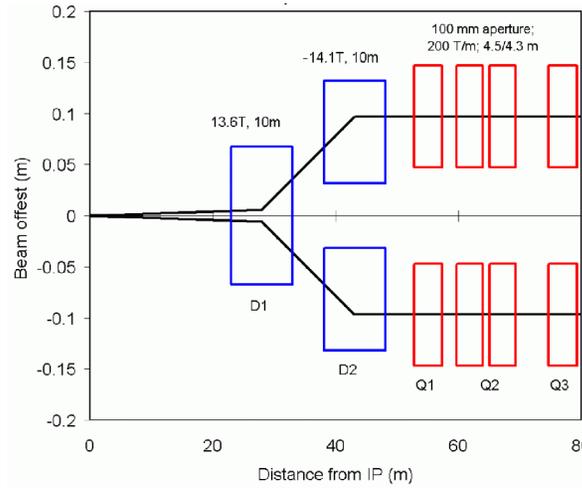
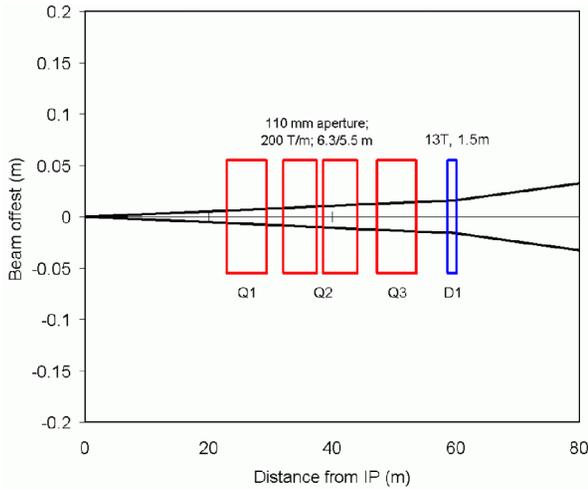
All scenarios need state-of-the-art IR quads

Need real operating experience

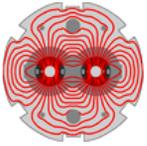
Hybrid layouts ?



LARP

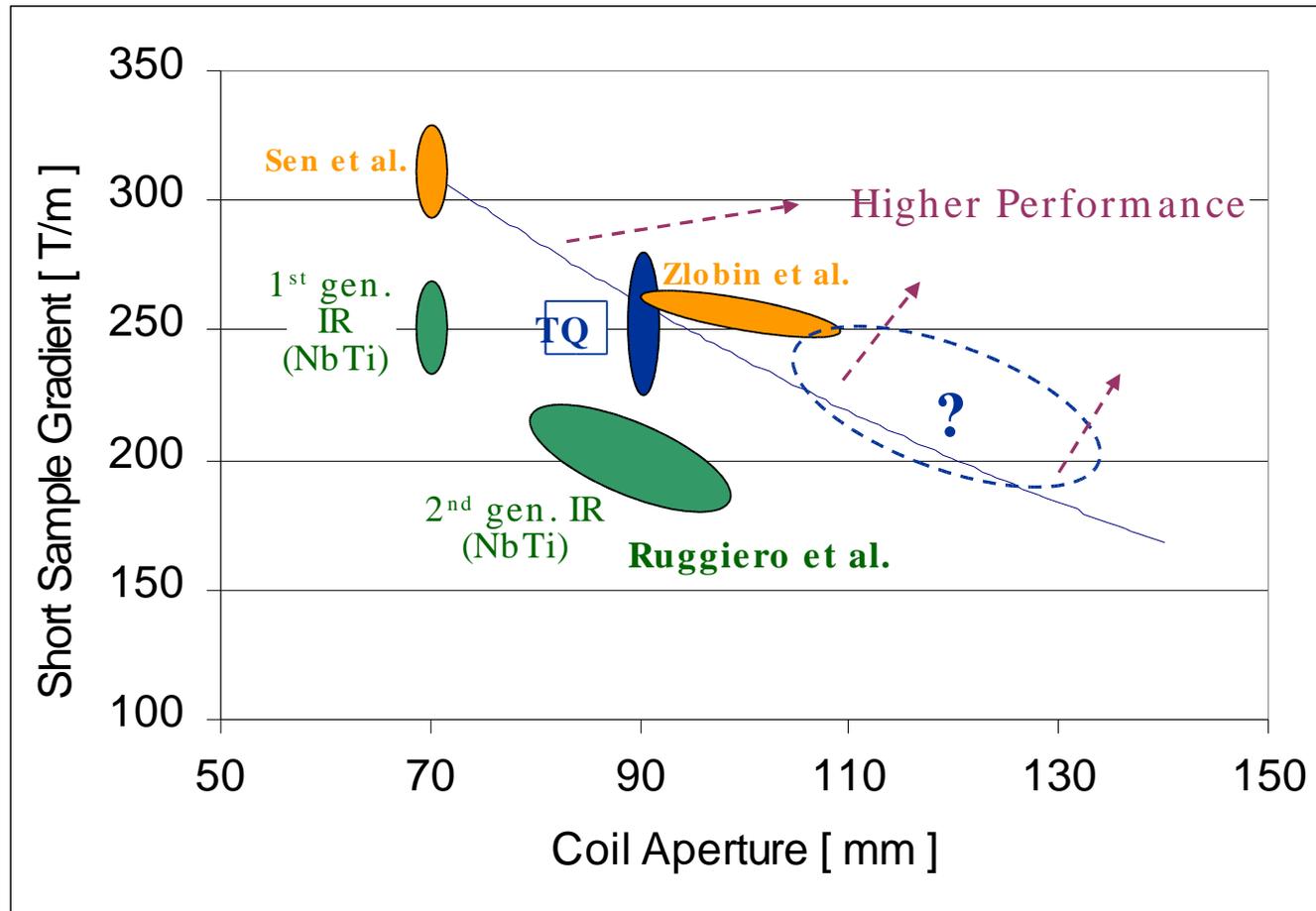


	Gradient [T/m]	Length [m]	Aperture [mm]	FY05	FY06	FY07	FY08	FY09
Model Magnets								
High gradient (costheta)	> 200	1	90		X X	X X		
Ultimate gradient	> 250	1	90				X	X
Long length, high gradient	> 200	4	90				X	X
Supporting R&D								
Sub-scale tests		0.3		X X	X X	X X	X X	X
Practice Coil		4			X	X		
Long coil tests		4				X	X	

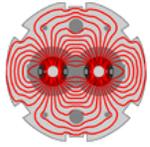


LARP

Nb₃Sn quadrupole parameter space



Optics studies along the load-line of constant pole-tip field



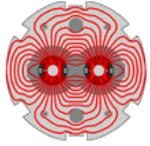
LARP

Quadrupoles

“The choice of the **coil aperture is driven more by the power density limit** than by the beam acceptance”

“An **estimate of the radiation** parameters of the magnets requires **extensive simulations** based on detailed knowledge”

OK, so is the upgrade debris power 900 W or 9 kW?



LARP

Commissioning

IR Comm. (aka Deliverable HC)
Hardware Comm. (aka Global HC)
outside LARP scope
Beam Comm
Instrumentation Comm (& exploitation)



Toohig Fellowships

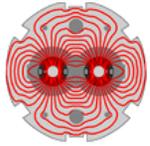


PhD's in Accelerator Science or Engineering

Toohig Fellowships last 2 years, extendible by 1 year, with approximately equal time spent at a U.S. lab (BNL, FNAL, LBNL, or SLAC) and at CERN.

Peter Limon taking this on

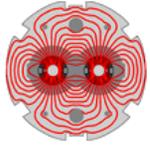
- poster
- advertising (PAC05, Summer school, CERN Courier, PT, ..)
- create selection committee
- first candidates attend Meeting #5 in October?



LARP

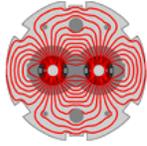
Commissioning Task Force (Shiltsev et al)

CTF makes **great progress**, including here at PJ
Concept of a Machine Commissioning Project (**MCP**)
Global Hardware Commissioners eligible for **Project Associate** status
Grey area between Deliverable HC and GHC: **“mission creep”**?
Pairing of junior & senior commissioners
RORO – Read Only Remote Operations ??
Surprising/interesting **manpower numbers**
- **financial assumptions** must be stated to US labs
RHIC: <6 month runs compatible with >6 month visits?
Integration into **Roger Bailey's table** ...



LARP

Collimation



LARP

Package 1: Studies on a [rotating metallic phase 2 collimator](#)
Responsible: T. Markiewicz, SLAC

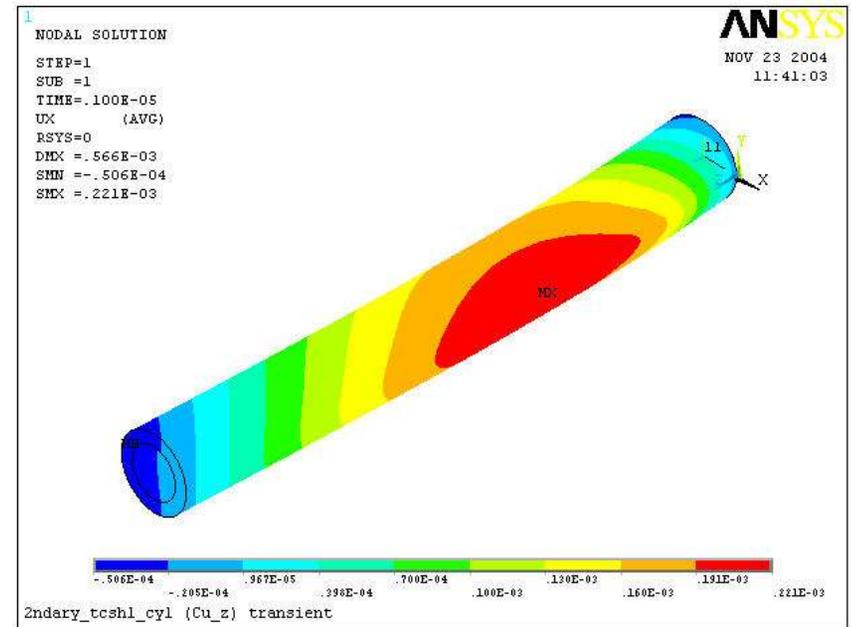
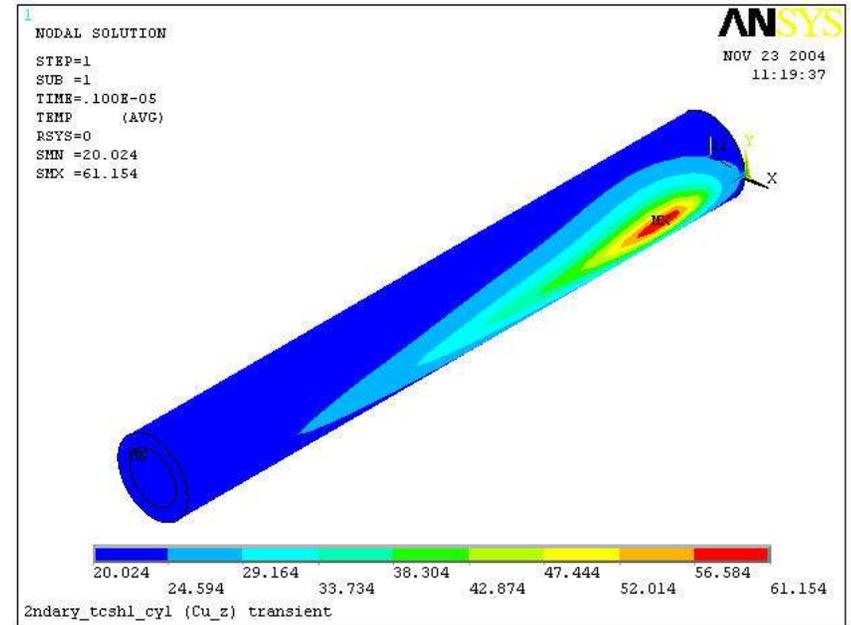
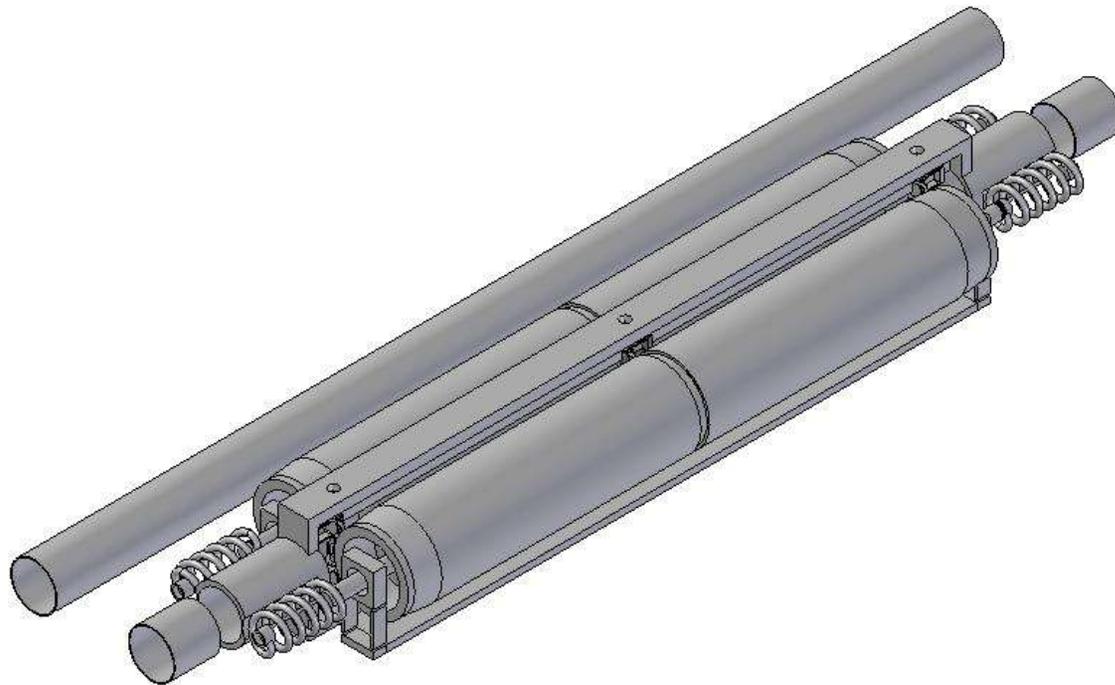
Package 2: [Fast set-up and optimization](#) of cleaning efficiency
(simulations and tests at RHIC)
Responsible: A. Drees, BNL

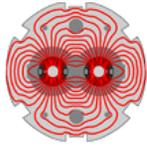
Package 3: Improvements with [tertiary collimators](#) at the LHC
experimental insertions
Responsible: N. Mokhov, FNAL

Package 4: [Radiation tests](#) of LHC collimator materials for
phase 1 and phase 2 [new proposed work package]
Responsible: N. Mokhov, FNAL & N. Simos, BNL



Rotatable collimators





LARP

Politics & Plans

SLAC proposed “Go-No Go” decision Spring '05 (~now)

After ~1 year of work SLAC feels that **rotating devices are feasible but still have great engineering challenges** given LHC requirements

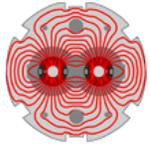
While still not having parameters of a prototype collimator in hand, SLAC:

- would like to **get rid off the “Go-No Go”** meeting concept
- would like to specify & eventually build and test several prototypes
 - Acquire lab space & infrastructure
 - Begin post-doc search and expand engineering team

Eventually SLAC will need an **“Engineering Review”** for the prototype

When/how/who remains an open question

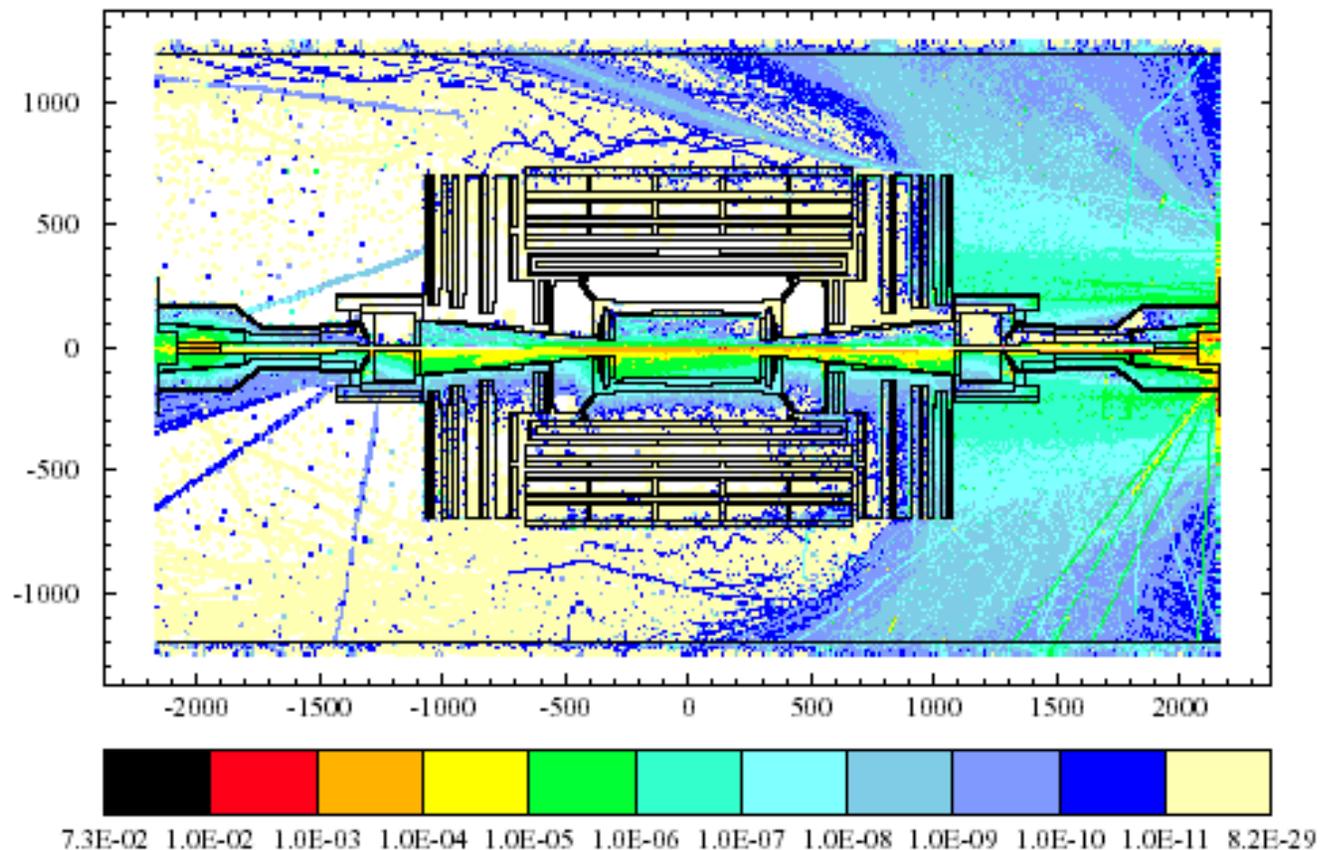
Tertiary collimators



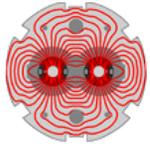
LARP

- Refining models for operational and accidental beam loss.
- Modeling in **IP5** and **CMS** with **tertiary collimators**

DOSE (Gy) IN CMS with COLLIMATOR (1999)



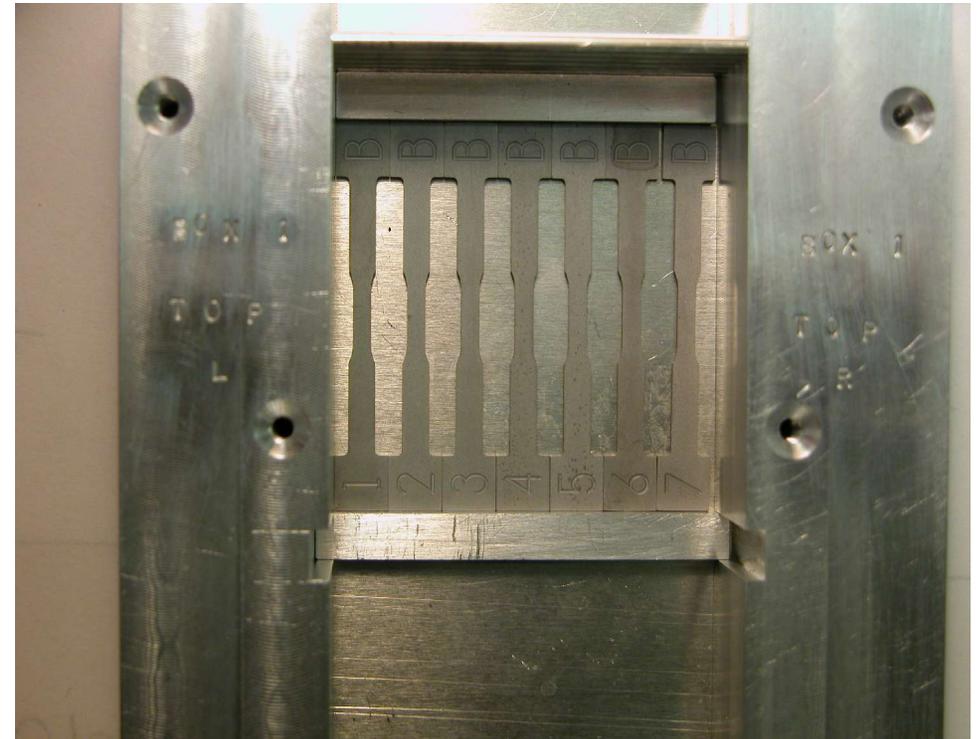
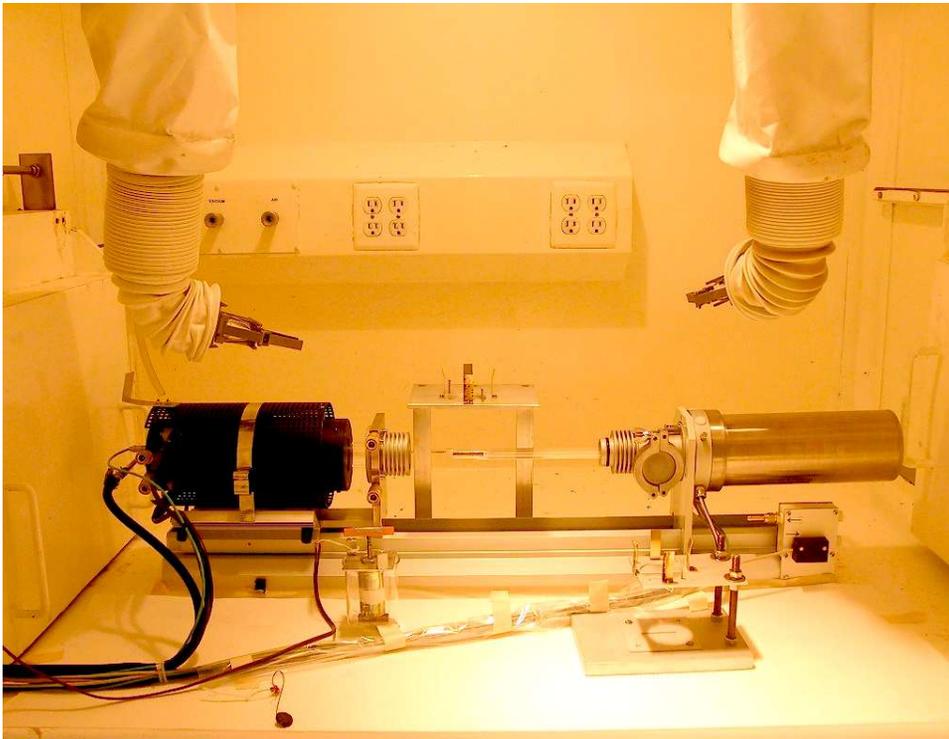
Port Jeff, Ap A peak dose rate at the inner pixels 1.8 kGy/s, 10^5 the nominal.



LARP

Proposed new task: Radiation tests

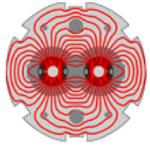
ASSESS the effects of proton irradiation on material properties
BNL AGS/BLIP/Hot Cell FACILITY



Port Jeff, April 8, 2005

S.Peggs

19



LARP

Group photo at 11 am !