



*brookhaven - fermilab - berkeley - stanford*

# Program Management

Steve Peggs

**Status, news & kudos**

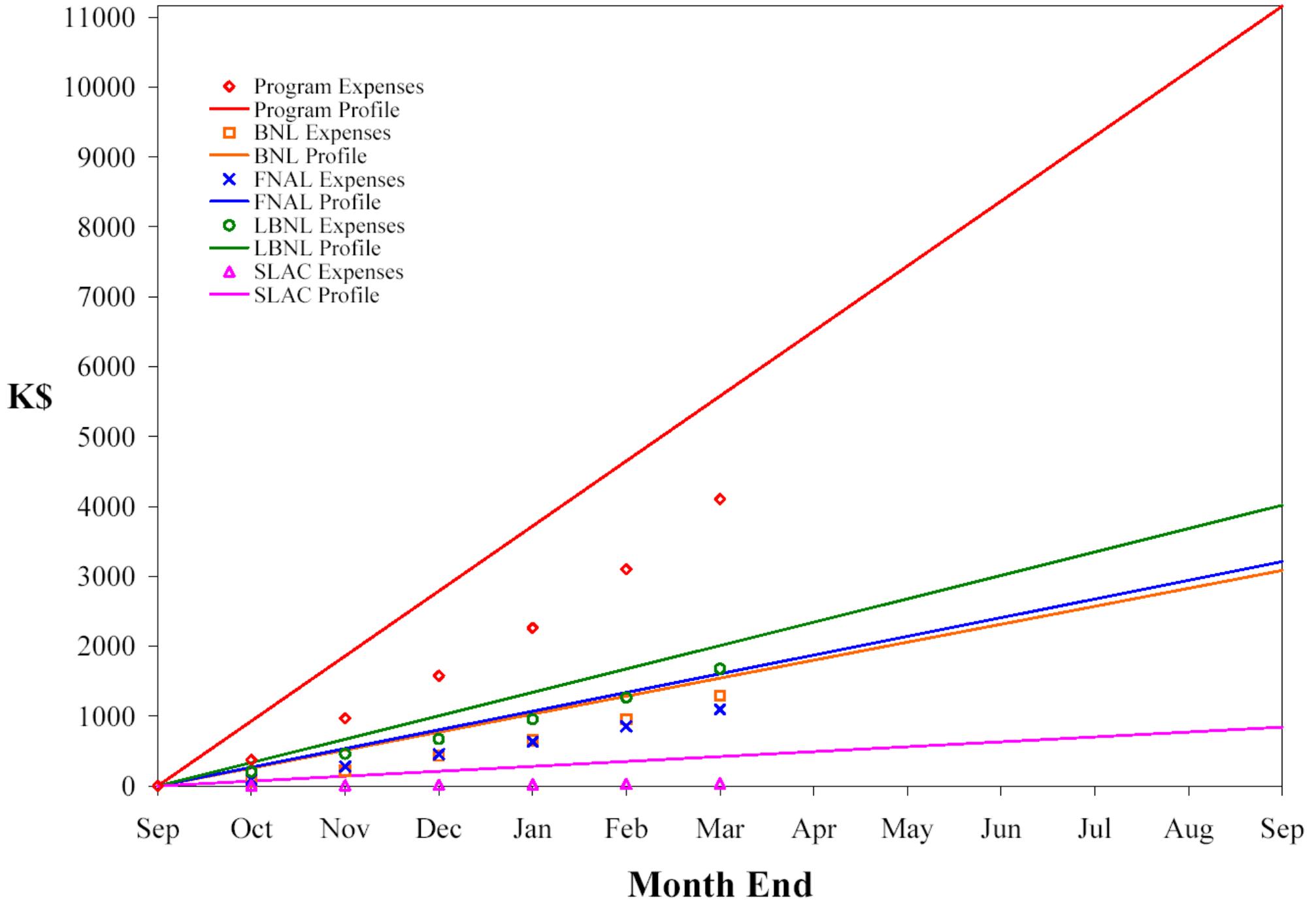
**Commissioning**

**Magnet complements**

**Safety**

**Potential new tasks**

# LARP PROGRAM \$11,158k FY06 Funding





## Q3 budget re-tune

	BNL \$k	FNAL \$k	LBNL \$k	SLAC \$k	Unallocated \$k	Total \$k
Current allocation	2130	2410	2980	780	2700	11000
Requested allocation	3264	3300	4086	350	0	11000
Requested increment	1134	890	1106	-430	-2700	0

36% (\$4.0M) in FY06 goes to Accelerator Systems

52% (\$5.7M) goes to Superconducting Magnet R&D

- More accurate re-distribution of “Toohig Fellowship” money
- Allocation of “Management Contingency” to many Tasks, mainly in small allotments.
- Decrease in funds to “Rotatable Collimators” at SLAC, reflecting a late start in engineering on the first prototype.
- Increase in funding to the “Long Racetrack” activity at BNL

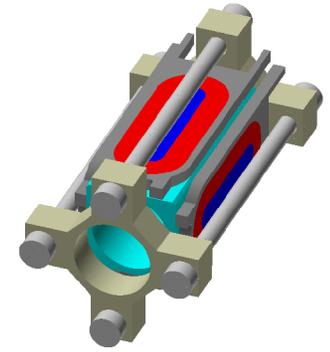


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# Status, news & kudos



# Subscale quad SQ02



Test at LBNL (Oct 05)

First thermal cycle 4.3 K

From 60% to 90% of predicted short sample current in 13 quenches

$$I_{\max} = 95\% I_{ss}$$

Second thermal cycle

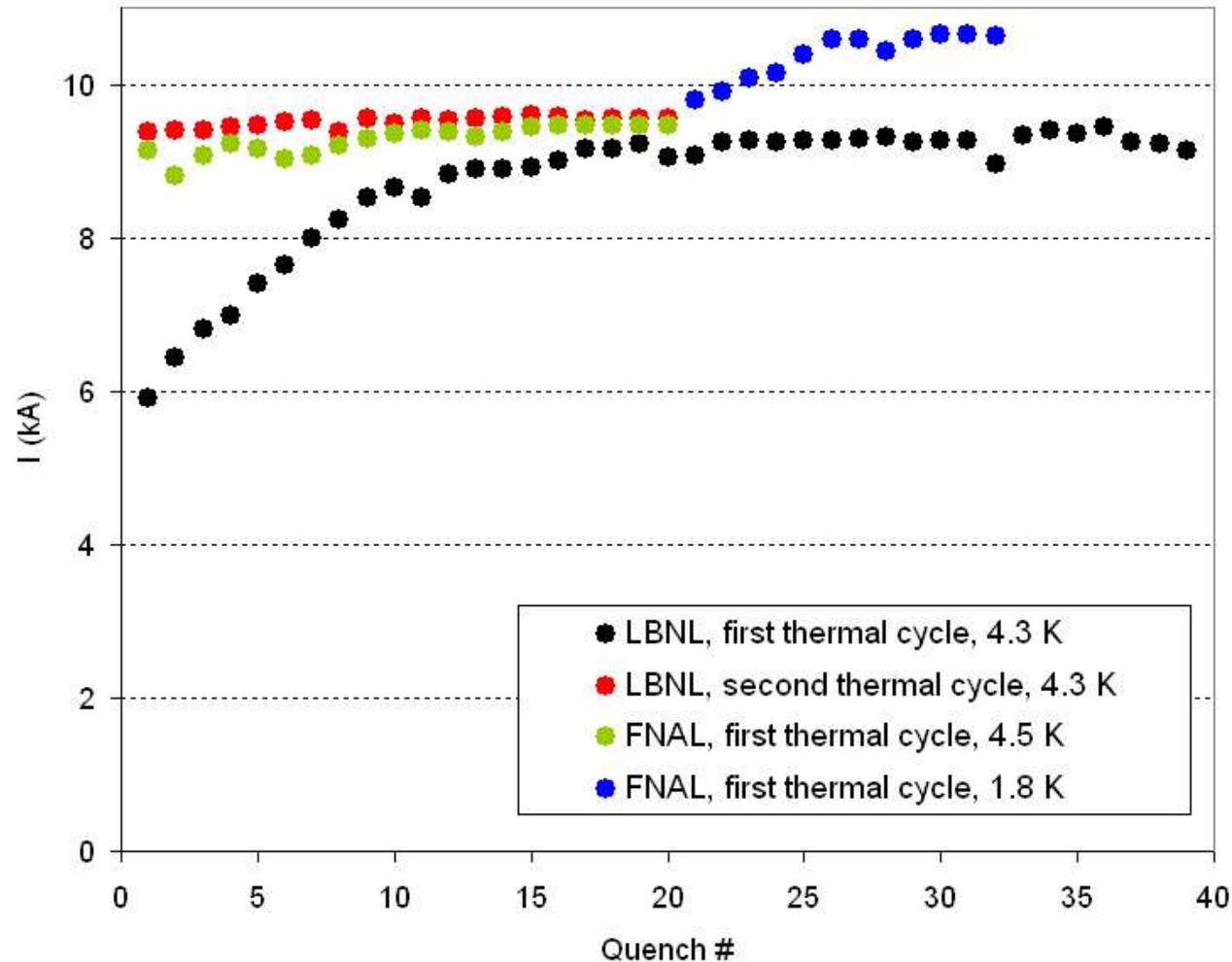
95% at 1<sup>st</sup> quench!

$$I_{\max} = 97\% I_{ss}$$

Retest at FNAL (Mar 06)

Higher axial pre-stress

$$I_{\max} = 10.6 \text{ kA (1.8 K)}$$



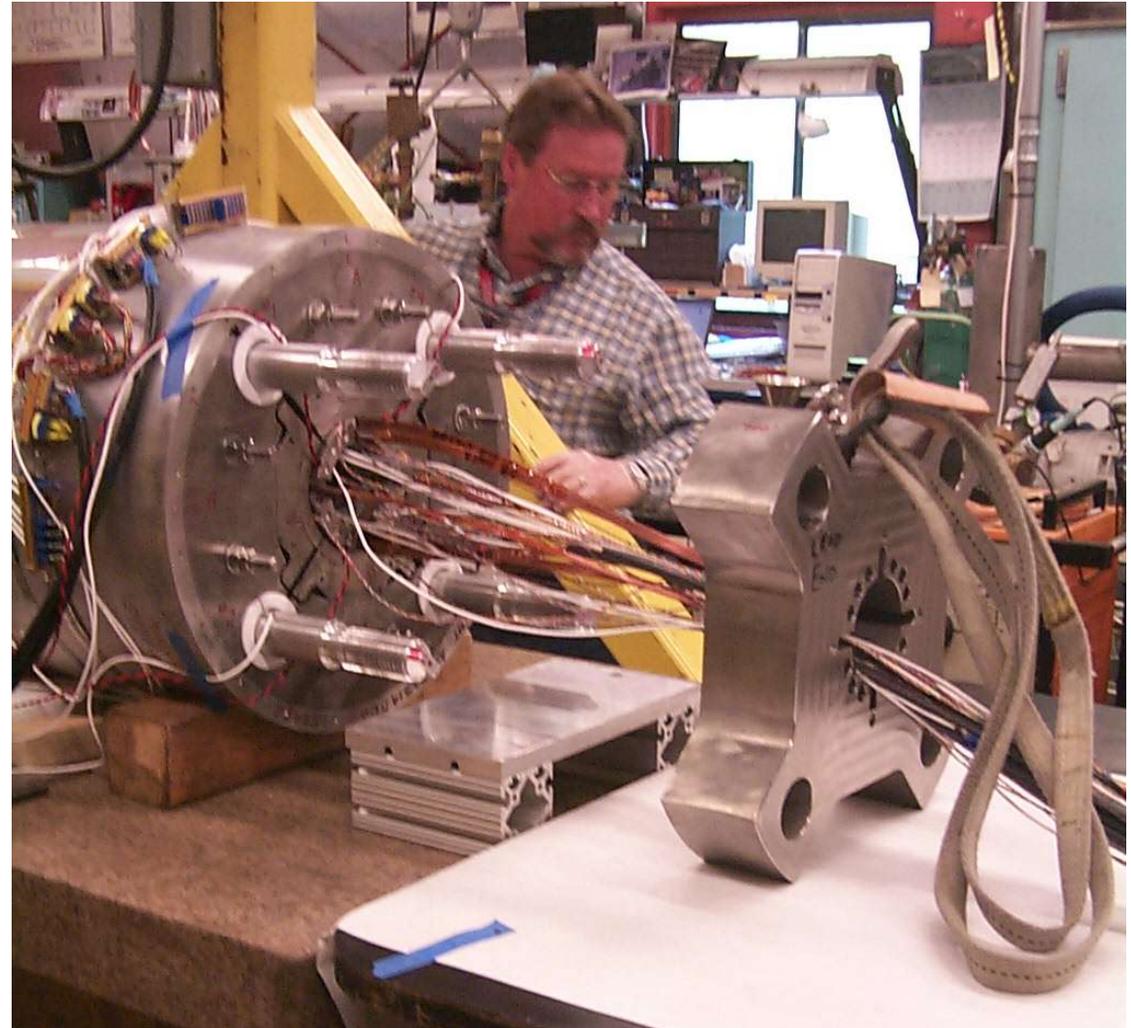


# Technical Quad TQS01

Currently under testing  
at LBNL

Has already achieved  
~90% of short sample  
limit

Measure stress evolution  
during cool-down, in  
case changes are  
necessary (disassemble  
& reassemble).



TQS01 End plate assembly

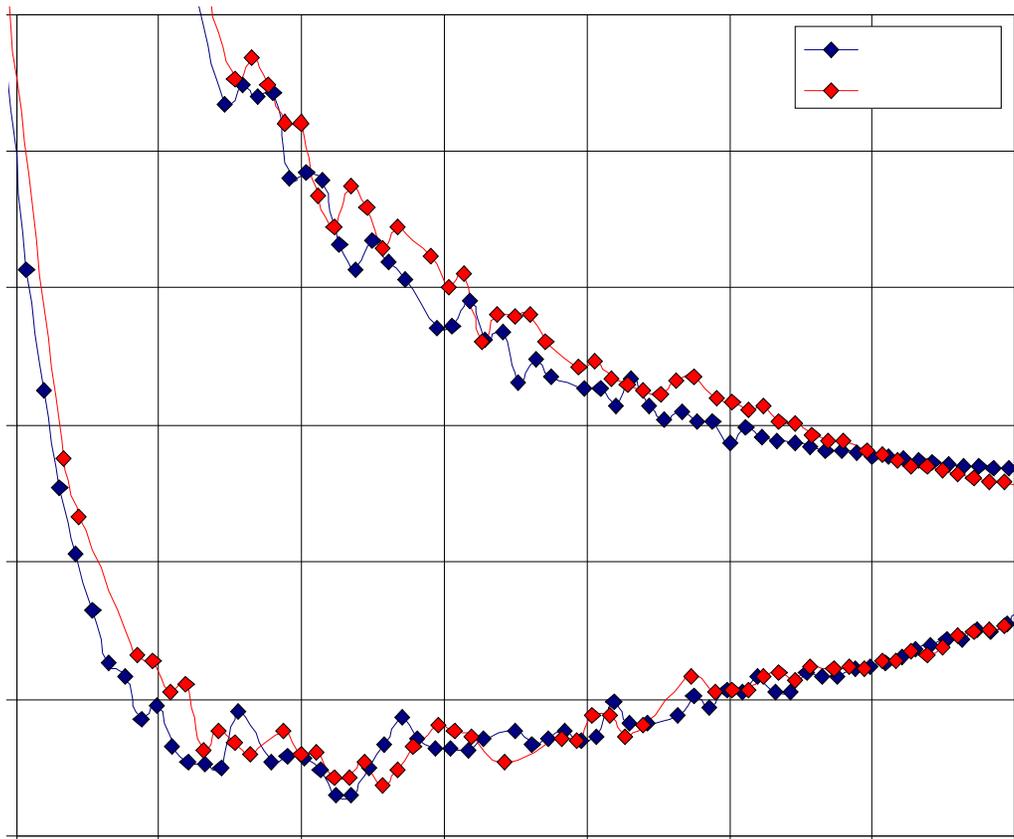


# Flux jump harmonic fluctuations

(V Kashikin)

Conductor instabilities can affect macroscopic field quality

Sextupole @10mm in HFDC01



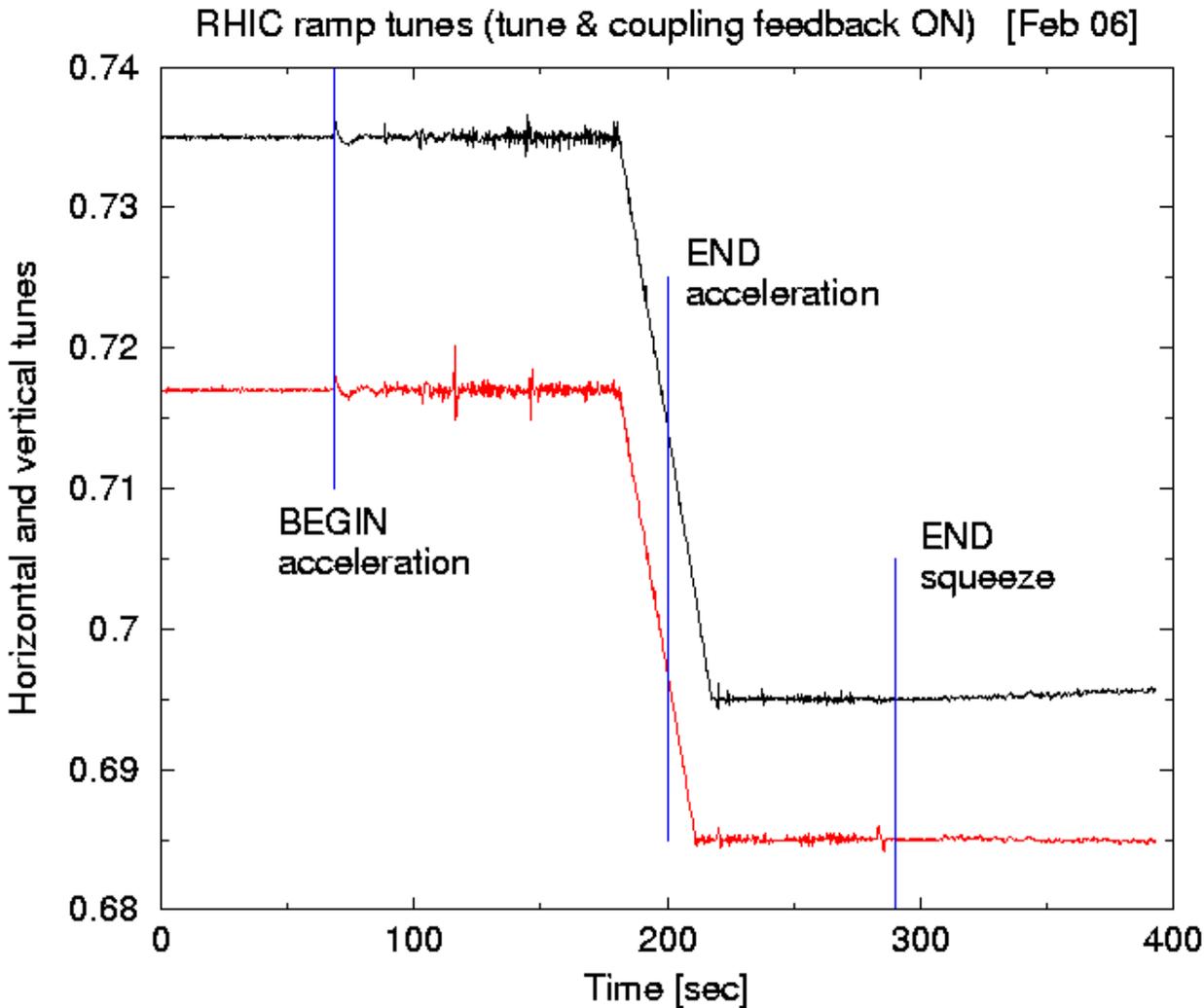
An accelerator magnet would need to demonstrate **no, or sufficiently small, fluctuations**

**AP:** How small?

**Mag R&D:** What reductions can material development achieve?

This is a cause for mild concern, not panic, but deserves considered attention

# World first success!



LHC will be very vulnerable to transients in the energy ramp

Recent results from RHIC show “military precision” in ability to maintain desired tunes (shown at LEFT)

Enabled by **WORLDS FIRST COUPLING FEEDBACK**

CERN Courier article forthcoming



# Collaborative success

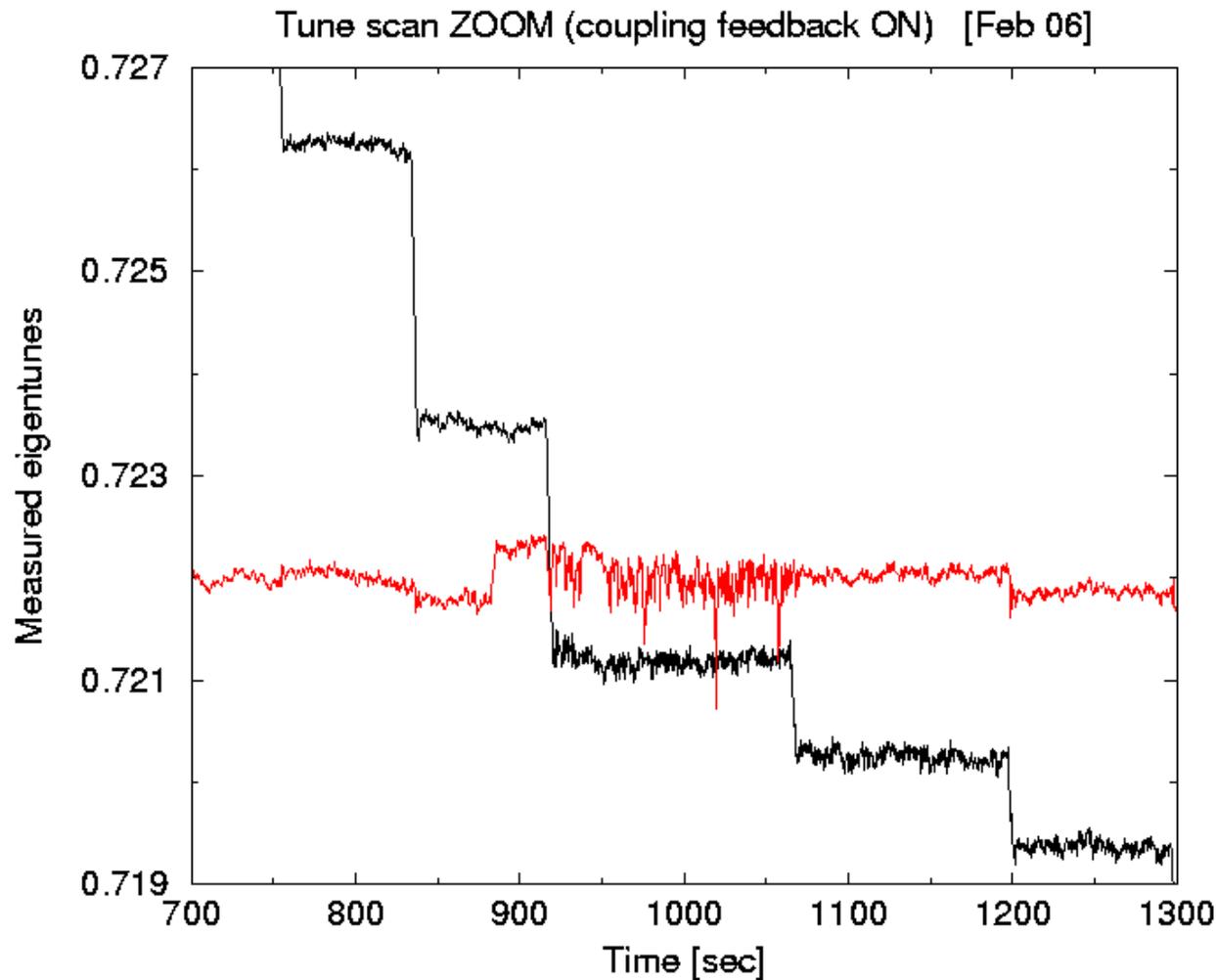
Stunning tune proximity is possible!

$\sim 0.0007$

Tune (& coupling) feedback are pre-requisites in the ultimate quest for chromaticity feedback

Unique skills of individuals:  
Cameron (BNL)  
Tan (FNAL)  
Gasior, Jones (CERN)  
combine to benefit all 3 institutions:

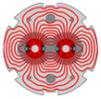
**BNL + CERN + FNAL**





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# Commissioning

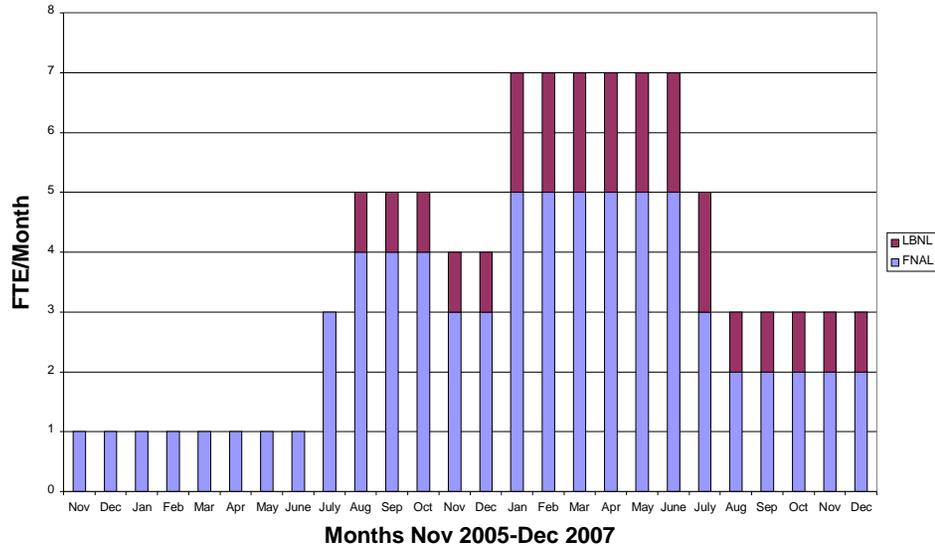


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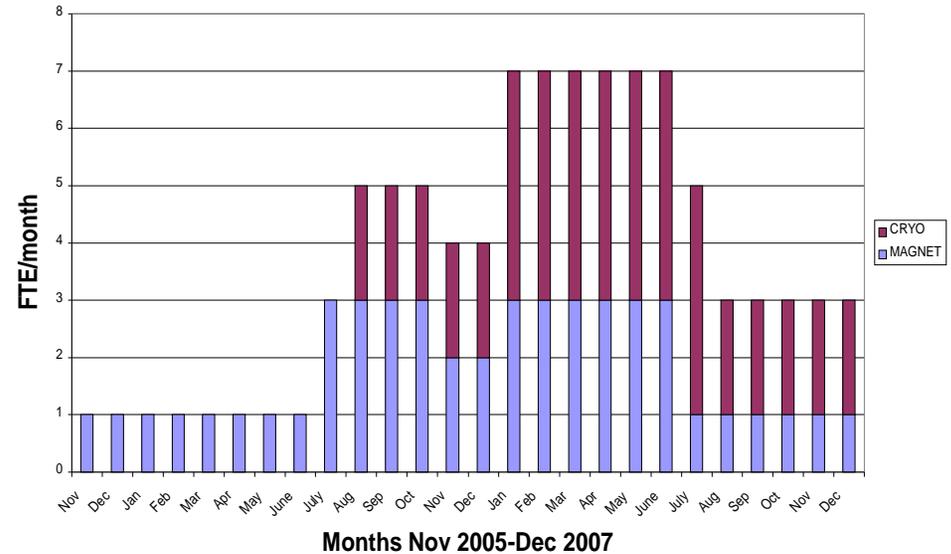
# The HC & IRC plan

(Feb 14, 06)

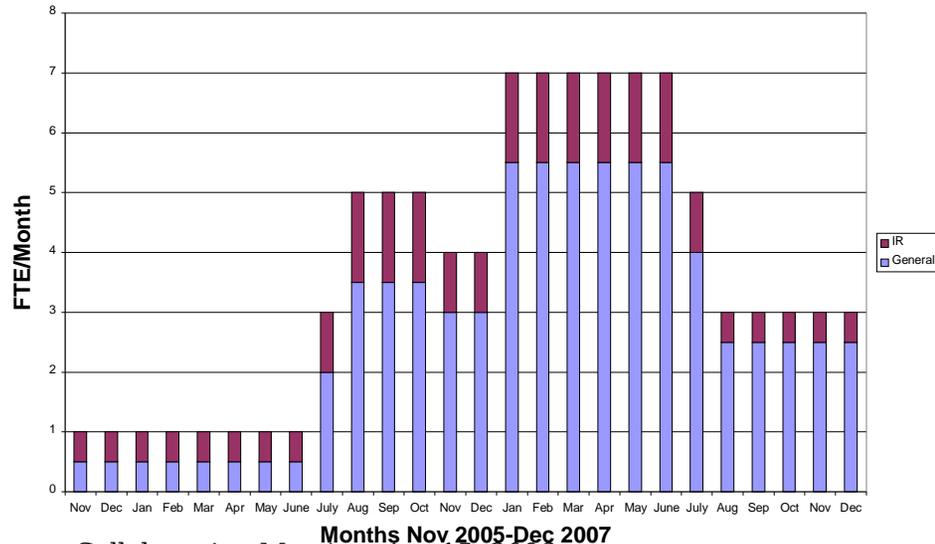
Blue: FNAL, Red: LBNL



Blue: Magnet, Red: Cryo



Blue: H Comm, Red: IR Comm



So far: 6 people from FNAL & 2 from LBNL are good matches to joint needs.

Peak of 7 FTEs during the expected peak in early CY07.

Of that, ~1.5 FTEs will work on the IR Commissioning of US deliverables.



# The plan TODAY

Task	Institution	Month	2005		2006									2007															
			Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	
IR	FNAL	Peter Limon	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
IR	FNAL	Sandor Feher																											
General	FNAL	Mike Tartaglia																											
General	FNAL	Bob Flora																											
	TOTAL	MAGNET	1	1	1	1	1	1	1	1	1	1	1	3	3	3	3	2	2	2	3	3	3	3	3	1	1	1	1
IR	FNAL	Roger Rabehl																											
General	FNAL	Christine Darve																											
General	LBNL	LBNL Eng.																											
IR	LBNL	Joseph Rasson																											
	TOTAL	CRYO	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	4	4	4	4	4	4	4	4	2	2	2	2
	TOTAL	MAG + CRYO	1	1	1	1	1	1	1	1	1	1	1	5	5	5	5	6	6	6	7	7	7	7	7	3	3	3	3

**Bad news:** start date for early activity postponed to Sept 1st.  
**Good news:** the date is SET.

Peter Limon is extending his stay into early 07. (LARP needs a permanent local leader/safety officer)

“General unofficial feeling is that hardware commissioning will not be finished even by Dec 2007”

LBNL participation is not fully resolved ...



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# Magnet complements



# Magnet Strategy

“A Strategy for European Superconducting Accelerator Magnet R&D Aimed at LHC Luminosity Upgrade” [CARE, March 06] includes 2 non-European authors (of 12): Gourlay & Peggs

## Quotes from the document:

“... the viability of  $\text{Nb}_3\text{Sn}$  technology ... should be demonstrated by 2010.”

“The LARP effort to demonstrate the feasibility of long  $\text{Nb}_3\text{Sn}$  quadrupole magnets is vigorously encouraged by CERN”

“Rather than competing, NED and LARP goals are synergistic – each supports the other.”

“The timely and successful completion of the LARP and NED programs will be instrumental (and be mandatory) ... for ... an LHC IR upgrade”



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## CARE + LARP

“A strategy will be devised in due time on how to share the magnet production between European and non-European partners”

“... the NED Activity ... should be extended to ... quadrupole ... configurations. When this happens, a joint working group should be set up between the European collaboration and LARP to enforce cooperation [on a comparative study].”

LARP would like to develop closer ties with CARE

- build upon today's good will and intellectual co-operation
- develop a “Global Strategy” document, including Japan



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# Safety



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# Safety

Peter Limon (resident at CERN) has been named “LARP Safety Officer”, at Herman Schmickler's suggestion

He will ensure that LARP visitors safety training is up to date at CERN and at their home institution

- make CERN training available via www ahead of time?

The U.S. attention to LHC safety is a cause of great sensitivity at CERN

Limon states:

“I do not think that CERN's rules are very different from Fermilab's rules. What is different is a certain attitude or conception about what the rules mean. Some of this is culturally ingrained ....”

LARP visitors MUST understand the CERN “stop work” reality

Safety presentations/discussions at all LARP collaboration meetings



## Letter from Staffin to Peggs & Limon

“The CERN Safety Commission and other CERN safety professionals are responsible for establishing and implementing institutional safety policies, requirements, and procedures at CERN.”

“As line managers of your respective programs, you are also responsible for the safety of U.S. personnel working at CERN in those programs.”

“I also expect you to monitor the safety performance of U.S. personnel in your programs at CERN through personal visits as well as tracking of incident/accident reports.”

**Swirling tide of emails and cultures?** Focus on the goal ....

See Eugene Lau's presentation & discussion  
- **Task Leaders** (“Principle Investigators”) have a critical role



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# Potential new tasks



## Calendar (partial)

Apr	26-28	Collaboration meeting (LBNL)
Apr	27	L2 meeting, 6 pm - 8 pm
May	10-12	LARPAC (BNL)
June	12-14	DOE Review (FNAL)
June	?	Executive Committee (FNAL?)
Oct	?	Collaboration mini-meeting (BNL)
Nov	?	CERN-U.S. Committee (CERN)
Dec	11	DOE mini-review (DC)

These meetings help the FY07 budget become more realistic as October 1 is approached

**New tasks?** National Co-ordinators (L2's) are the gatekeepers, and must play an activist role



# New Task Proposals

LARP maintains an “open door” policy for new tasks

Many are proposed each year. Most are rejected or deferred, often in spite of great technical merit, to defend existing priorities.

A successful R&D proposal indicates

- how it fits within LARP goals, budget & schedule
- how it involves multiple U.S. labs

Collaboration meeting discussion is required for new scope

Major new tasks require Change Control Procedure approval

- “major”: 6 months and/or \$100k and/or new scope
- Program Leader presents consensus proposal to Executive Committee (June ?)

New tasks usually enter on October 1



# Mid-scale Instrumentation

A March NSF letter to LARP (and others) solicited “mid-scale instrumentation” needs.

We quickly responded with a list “Additional Tasks of Great Potential”:

## Advanced Beam Instrumentation

- 1) AC dipoles, 2) Beam-Beam compensators, 3) Optical stochastic cooling, 4) Synch light based diagnostics

## Second generation IR upgrades

- 1) Crab cavities, 2) IR dipole/magnetic TAS

## Superconducting magnet support

- 1) Cable test facility, 2) Heat exchangers & internal absorbers, 3) Radiation resistant insulation

It turns out that **NO mid-scale instrumentation will be funded, anywhere, BUT some things remain true .....**



# University involvement

- 1) These tasks (and others) still have **great potential**
- 2) Most could be defined to have a **modest cost**
- 3) **There is excellent talent beyond the 4 LARP Labs in universities**
  - Berkeley, Cornell, FSU, Indiana, Kansas, Maryland, MIT, MSU, NIU, Stanford, Stony Brook, UCLA, USC, Texas A&M, Wisconsin, ...
- 4) **Modest NSF funds are possible for:**
  - Accelerator Science fellows placed at Universities
  - Task proposals lead by University accelerator scientists

Looking for creative suggestions to take to NSF at close of this meeting .....