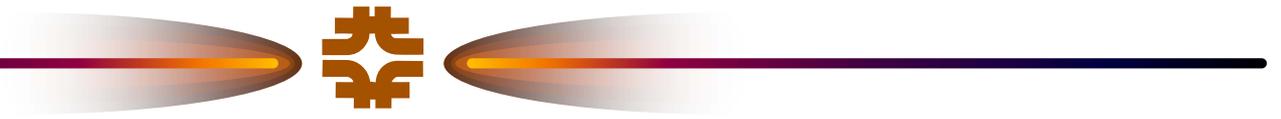


LARP – Trip to CERN



- Purpose
- Contacts
- Findings



- **Chamonix workshop Summing-Up**
 - <http://ab-div.web.cern.ch/ab-div/Conferences/Chamonix/2004/SciProgramme/sciprogram.html#Anchor-Summary-6296>
- **Follow-up meetings to Chamonix discussions**
- **Possible U.S. commissioning work/CERN visits to U.S.**
- **Close-up look at LHC status**



- **Roger Bailey – LHC commissioning**
- **Gianluigi Arduini – TI8 commissioning, SPS tests**
- **Mike Lamont – Sector test**
- **Hermann Schmickler – Instrumentation**
- **Rudiger Schmidt – Machine protection**
- **Steve Myers - Generalities**
- **Vinod Chohan – Magnet measurements**

Findings/Results – Summing Up



- Lots of information in 3 hours
 - Injector issues
 - Early/intermediate beam parameters met
 - SPS longitudinal impedance
 - Kicker thermal heating
 - Beam blow-up due to kicker impedance
 - LEIR in 2005

Findings/Results – Summing Up



- Commissioning through 2007
 - TT40 largely successful
 - TI8 in September/October 2004
 - Injection test in 2006 (following 18-month SPS stop)
 - LHC commissioning in Feb/Mar 2007
 - Beam-induced quenching as part of Sector test

Findings/Results – Summing Up



- Magnets
 - Non-uniform cable
 - 183 dipole cold masses received
 - Most reach design in <6 quenches
 - Sagitta issues
 - 74 cold masses measured at 1.9K
 - Quad cold masses lagging
 - Insertion quads in good shape
 - Correctors tight schedule
 - Reference Magnet System is a hot topic and is being evaluated

Findings/Results – Summing Up



- Installation & Commissioning
 - >5-month delay in QRL (transfer line installation)
 - Cryo magnet transport demonstrated last week
 - Coordination is vital
 - 28-day cooldown
 - 2-3 months to replace a component, lots of CHF's (260,000)
 - Hardware commissioning a big deal

Findings/Results – Summing Up



- Running in the LHC
 - Year 1 (2009?)
 - 16-week shutdown
 - 4-week checkout
 - 4×10^{10} protons/bunch, 25 ns spacing, 10^{33} luminosity
 - Initial operation at lower energy
 - Fast neutron damage to equipment possible during commissioning > electronics redesign
 - Scrubbing takes longer when cold
 - Beam Energy calibration
 - Instrumentation vital for machine protection (16-hour quench recovery)
 - Careful commissioning choreography
 - Beam dumps
 - Orbits
 - Collimation
 - Beam loss

Findings/Results – Summing Up



- LHC Operation from the CCC
 - Single Control Room
 - Expanded PCR (Preveessin site)
 - All operations under one roof
 - \$8M CHF
 - On-line in 2006
 - Sociological issues

Findings/Results – Roger Bailey



- 6-8 week visits by U.S. scientists beneficial
- 8-week visits by CERN staff ditto
- Francisco Ruggiero will coordinate on CERN side
- September 2004 busy, interesting time for visitors to CERN
- Mid, upper level software is JAVA2EE

Findings/Results – Mike Lamont



- Sector Test coordinator in May 2006
- Up to one year delay by QRL?
- Broad scope outlined, details still quite fuzzy
- Remote operations

Findings/Results – Herrmann Schmickler



- Three vital pieces on Instrumentation
 - Longitudinal Density Monitor
 - Luminosity Counter
 - Tune Tracker/PLL
- Superconducting pick up not necessary
- Focus on one Tune Tracker
- Longitudinal Density monitor is his perceived most important piece of Instrumentation U.S. can provide
- U.S. involvement should include
 - Install
 - Commission
 - Document
 - Train
 - Remote diagnosis
- Allocating his resources based on U.S. ‘promises’

Findings/Results – Gianluigi Arduini



- Coordinates SPS Machine Development
 - PS to SPS injection matching
 - 10-20% transverse blow-up at present
 - help is welcome
 - TI8 commissioning
 - 2 weekends in September, October 2004
 - Beam Scrubbing
 - Additional week just added
 - 2004 is critical year
 - Collimator testing

Findings/Results – Rudiger Schmidt



- Machine Protection
 - LHC permit loop overview
 - Automation of hardware tests might need help
 - Post-mortem systems needs specification
 - Operational model of collimation needs work



- U.S. Instrumentation vital
 - Perceived lack of coordination
 - Longitudinal Density Monitor is critical?
- This fall would be prime visit time
 - Sense of CERN
 - Participate in commissioning
- Hardware commissioning another critical time
- Encourage CERN visitors
- U.S. could facilitate Machine Protection?
- Communication!