

LARP Dipole development

This dipole is designed for a dipole first geometry. Dipole first to minimize long range beam-beam (Steve P)

Our approach is heavily influenced by the IP beam spray environment at 10E35 (Nikolai M)

Heat Load

Cryogenic design

Radiation damage

Integrated design to allow for balance across all systems (cryogenics, component lifetime, etc.....)

We need to endorse this approach for LARP since the magnet complexity is driven largely. It is important for this review Committee to do this (or not !)

LARP Dipole Development

We have been trying for the past several months to simplify the dipole design by reducing the aperture (primarily horizontal). This has not been as successful as I would have hoped (Ramesh G).

Can we produce IR designs with lower dipole fields (12.5T). This would certainly result in cheaper magnets. High fields also tend to push towards wind-and-react technology (Arup G).

LARP related issues:

Does the postulated R&D program achieve the desired result

Is it well integrated with the other parts of the program (technology)

Does it fit into the cost profile

LAPAC was of the opinion that LARP does not have sufficient resources (~\$2M/yr) to permit a viable dipole program

LARP Dipole Development - Committee Members

MEMBERS OF LARP DIPOLE REVIEW COMMITTEE

Giorgio Ambrosio (Fermilab), Chair

Paolo Ferracin (LBNL)

Vadim Kashikhin (Fermilab)

Tom Taylor (CERN)

Tanaji Sen (Fermilab)

Rich Stanek (Fermilab)

Steve Gourley (LBNL)

LARP Dipole Development - Committee Charge

REVIEW OF LARP SEPARATION DIPOLE R&D – Charge to Review Committee
P. Wanderer – November 2, 2004

The Committee is asked to review:

- The concept of a dipole-first IR upgrade for the LHC that uses two dipoles (D1a and D1b, possibly identical), each with an open midplane. Does the concept address the basic performance requirements, including beam-induced heating at $\mathcal{L} = 10^{35}$, as they are currently understood? (An example of dipole-first optics is given in the PAC03 “LHC IR upgrade” paper of Strait et al.)
- General parameters of a D1a open midplane design, including length, peak field, central field, field uniformity, good field aperture, Lorentz forces, stored energy, quench protection, and temperature margin. Have the major issues been identified?
- Near-term R&D on the open midplane concept, specifically the open midplane assembly of LBL subcoils in BNL fixtures, including instrumentation and test plans.
- Plans for an efficient R&D path that includes the steps necessary for validating the D1a concept and identifies the point at which LARP would move forward with the construction of a proof of principle cold mass.
- FY05 LARP task sheets for the above work.

LARP Dipole Development - Meeting Agenda

AGENDA - LARP REVIEW OF OPEN MIDPLANE DIPOLE PROGRAM AT BNL
December 14-15, 2004 (agenda as of December 7)

Tuesday, December 14

- 9:00 M. Harrison – welcome and overview (10 min.)
- 9:10 S. Peggs – AP input for dipole aperture and field quality (20 min.)
- 9:35 R. Gupta – Conceptual Design of a smaller aperture open midplane dipole (45)
- 10:35 Coffee break
- 10:50 N. Mokhov – Energy Deposition Studies For Open-Midplane LARP Dipoles (30)
- 11:30 J. Schmalzle – Mechanical analysis of conceptual design dipole (30)
- 12:00 Lunch in BNL cafeteria
- 1:00 Tour of magnet facilities
- 2:00 P. Wanderer – R&D plan for open midplane dipole (20)
- 2:30 J. Schmalzle -- Experiments with assembly of LBL subcoils (30)
- 3:10 Arup Ghosh – Summary of recent test results with react and wind coils (30)
- 3:45 Coffee break
- 4:00 P. Wanderer – Modular upgrades for the LHC cryo system (20)
- 4:30 Executive session
- 5:30 Questions for BNL

Wednesday, December 15

- 9:00 Executive session, starting with responses from BNL
- 11:30 Closeout