



LARP Internal Review of the MQXF Mechanical Structure Design and Functional Requirements

LBNL, USA – July 16th - 17th, 2015

Charges

The High Luminosity LHC (HL-LHC) project has been approved as first priority by the special CERN Council held in Brussels on 30 May 2013. In May 2014 HL-LHC has been rated among the top priorities for US HEP in the next decade by the P5 committee and in June 2014 the CERN Council has approved its financing in the year 2015-2025.

HL-LHC is entering in the final stage of design and prototyping: all technologies for the hardware upgrade must be fully proven. The replacement of the present inner triplet (IT) quadrupole magnets by new quadrupoles (MQXF), featuring much larger aperture and higher peak field, is the cornerstone of the upgrade plan. Tests of the short models of final design (MQXFS), foreseen in 2015 and 2016, and of the long prototypes (MQXFL), planned for end 2016, are on the critical path.

In particular, the Mechanical Structure (aka Shell Structure) developed by LARP for the mechanical containment and distribution of forces during the magnets cool down and powering up is a major element of the plan for successful demonstration in LARP of the feasibility of long prototypes mentioned above. This argument, in addition to the non-negligible cost to the LARP program for the long prototype mechanical structure is prompting the need for an internal LARP review of the Long Mechanical Shell Structure with the following charges:

1. Are the Functional Requirements and Technical Specifications for the MQXFL Mechanical Structure properly developed, reasonably finalized and documented ?
2. Is there any basic flaw in the Requirements to prevent an expedited transition to the design and procurement phase of the MQXFL Mechanical Structure ? Is all tooling properly considered ? Are plans for Value Engineering properly taken into account ?
3. Is the experience gathered in the 10-year long LARP program and, especially, in the preparation and assembly of the mechanical structure and complete magnet assembly for the latest MQXFS (Short QXF Model) properly incorporated in the Functional Requirements and Specifications ?
4. Is there enough knowledge to validate, at this time, the basic cost estimate and schedule for the procurement by LARP of one or two MQXFL Mechanical Structure(s) ?

The review is scheduled for July 16th-17th, 2015. A short written report to the LARP Program Director is expected within one week from the completion of the Review.

Reviewers:

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Observers:

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