

Charge for the Construction Readiness Review: Extinction Beam Line Collimation System

February 20, 2017

The Mu2e project received CD-3 approval from the DOE on July 14, 2016, allowing the project to start construction. Before initiating fabrication, a Construction Readiness Review is required to confirm the soundness and completeness of designs, the procurement and quality assurance plans as well as the coherence of all interfaces with respect to neighboring subsystems.

A critical requirement of the experiment is beam line “extinction”; that is, the requirement that there be no beam outside of the nominal beam bunches at a fractional level of less than 10^{-10} . Part of the required extinction will be achieved during the process of bunch formation, with the remaining extinction coming from a system of resonant magnets and collimators in the M4 beam line.

The scope of this review is limited to the three horizontal extinction beamline collimators as well as the associated control system. In particular,

- The “Tail Collimator” eliminates beam scattered by the electrostatic septum in the slow extraction system of the Delivery Ring.
- The “Halo Collimator” is located 90° of phase advance upstream of the resonant dipole system. Its purpose is to clean up high amplitude out-of-time particles, which might otherwise be steered into the transmission channel by the dipole.
- The “Extinction Collimator” is located 90° of phase advance downstream of the resonant dipole. The resonant dipole system will cause out-of-time beam to hit this collimator.

The two upstream collimators are identical. Each has two 1 m long stainless steel jaws, with independent control and position read back at each end, such that both gap and angle can be precisely controlled. The extinction collimator is very similar, except that the jaw is made of Tungsten, to eliminate any chance of punch through of out-of-time beam. All materials, design drawings, and cost estimates prepared to support this CRR are included in Mu2e-docDB 8723.

Mu2e project management requests that the committee review the parts of this subsystem within the above cited scope and address the following questions:

1. Were the comments and recommendations of the CD-3 review addressed in a satisfactory manner?
2. Are the designs and mechanical drawings of the collimators and control system sufficient to proceed with procurement?

3. Are the procurement plan and the installation sufficiently defined to ensure that laboratory quality standards will be met?
4. Are additional resources and/or guidance required from the Mu2e project to ensure that the system is acquired and installed.

The review is scheduled for February 20, 2017. The committee is requested to submit a report containing its responses to the charge questions and its recommendations to the Mu2e Project Manager within two weeks after the conclusion of the review.

The following people have agreed to serve as Mu2e Radiation Safety Construction Readiness Reviewers:

Review Committee:

Kevin Duel (FNAL, AD)

Curt Preissner (ANL, APS)