

We begin with a quote from the P5 report:

A muon-to-electron conversion experiment at Fermilab could provide an advance in experimental sensitivity of four orders of magnitude. The experiment could go forward in the next decade with a modest evolution of the Fermilab accelerator complex. Such an experiment could be the first step in a world-leading muon-decay program eventually driven by a next-generation high-intensity proton source. ***Development of a muon-to-electron conversion experiment should be strongly encouraged in all budget scenarios considered by the panel.***

We need to move quickly to align ourselves with P5. We believe the experiment is sufficiently developed for a proposal. The items below are needed for CD-1 and CD-2 but must be started now in order to proceed as efficiently as possible.

REQUESTS TO FNAL:

1. The critical path item is the design and construction of the solenoid system. We need a major effort from TD to absorb the old design and move it forward. There will be a review of the MECO design by TD: Mike Lamm, Brad Smith and others to help understand the state of the MIT design and incorporate their work into the FNAL TD. This needs to happen as soon as possible and be an ongoing effort especially with Brad Smith.
2. We would like a liaison physicist from the Antiproton Source Department to be assigned to the experiment immediately to begin work before the proposal is submitted in the fall. We need help to design the beam from the Booster through the production target. This involves transport from the Booster to the Accumulator, beam physics issues in the Accumulator and Debuncher, RF manipulation, and the slow extraction from the Debuncher.
3. We need a radiation safety physicist to work on the radiation issues and ES&H concerns, especially in the Accumulator and Debuncher region, as soon as possible.
4. We need help from FESS to develop the cost and options for siting the experiment. We require a rough cost estimate for the building and infrastructure.
5. We need to intensify the design and construction of the AC dipole for the extinction channel. There is already a group working on the extinction problem in conjunction with KEK; they require roughly \$100K in the next year for prototyping.
6. We must have at least one physicist/programmer to design a code framework for the experiment so that it can perform detailed simulations of backgrounds and calculations of the resolution.

REQUESTS TO DOE/NSF:

P5 has stressed the importance of supporting university groups. The groups collaborating on Mu2e need a rapid infusion of seed money to support an aggressive ramp-up of effort on the experiment. The universities on Mu2e need at least three FTE post-docs for the tracker, the calorimeter, and resolution studies. It would be useful to have two guest scientist positions at Fermilab. Some immediate needs are:

1. Detailed Monte Carlo simulations of the detector system.
2. To prototype the L-tracker in case the software indicates it is the desirable choice. A real system design, including the gas system and supports, is required to understand the total material in the electron path.
3. To obtain a sample of PWO-II (lead tungstate) and LSO crystals to measure the response of a prototype calorimeter in a 100 MeV electron test beam.
4. To develop a set of measurements for redundant, overlapping calibration techniques.