



U.S. Muon Accelerator Program Director's Update

Mark Palmer | May 25, 2014

Comments on the P5 Report and Where We Are Heading

Dear All,

I wanted to write to all of you with a few comments about the P5 recommendations as well as some information about the path forward for our research team. For those who may not have been able to listen to the HEPAP meeting of the last 2 days, the materials can be found at:

<http://science.energy.gov/hep/hepap/meetings/>

The materials there include a presentation by Steve Ritz which takes one through all of the recommendations in the full report, a link to the Executive Summary, and a link to the full report. In addition, you may want to take a look at Jim Siegrist's DOE response:

http://science.energy.gov/~media/hep/hepap/pdf/May%202014/Siegrist_2014-05-23_P5_Response_HEPAP_Talk_v1.pdf

The theme of the report can be summed up as "Science Drivers." It is important to note that the arguments presented to support the P5 Recommendation 25, which is specific to MAP, are that the large value of θ_{13} and the emphasis on a relatively low energy collider to study the Higgs extends the timescale on which the community needs to consider muon accelerator technologies. Of course, these are the technologies that we have clearly shown can provide the highest precision neutrino "microscope" to study CP violation and new physics in the neutrino sector as well as offering great potential for collider studies at the several TeV energy scale.

While I think we are all deeply disappointed at the P5 recommendation that a facility-directed feasibility assessment for Muon Accelerator capabilities is not integral to the US community's near-term science needs, we mustn't forget that our recent reviews by our program advisory committee (MuPAC) and by the DOE both clearly recognized the progress that has been made towards establishing the feasibility of muon accelerator technologies for HEP applications and have strongly endorsed our plan to move forward with the MAP Feasibility Assessment. The key elements detailed in that plan are:

- Implementation of the Muon Accelerator Staging Study (MASS) Recommendations
- Establishing a new baseline to guide our technology demonstrations via the Initial Baseline Selection (IBS) process



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- A robust program of Technology R&D, with a particular focus on studies of RF cavities in magnetic fields at the MuCool Test Area hosted by Fermilab
- Completing the demonstration of ionization cooling with RF via the MICE effort hosted by Rutherford Appleton Laboratory
- Demonstration of critical muon accelerator technologies, e.g., construction of a 6D cooling channel prototype, by the end of the decade

In this context, Jim Siegrist has asked MAP to prepare for a special review in July to lay out our vision of how to move forward over the next few years within the framework specified by P5. The short timescale for carrying out the review is intended to provide input for next year's funding levels as well as to enable sharing with the Accelerator R&D sub-panel that has recently been convened by HEPAP. The MAP management team is already beginning detailed preparation for this review and I will be consulting with DOE on the exact wording of the charge as it is developed.

An important point to note is that DOE is very sensitive to the investment that has already been made in muon accelerator capabilities and the fact that this investment cannot simply be abandoned. Furthermore, there is great sensitivity to the international commitments involved. For instance, earlier this week, I spoke with John Womersley of the Science and Technology Facilities Council in the UK who will shortly be meeting with Jim Siegrist to emphasize the importance of successfully completing a demonstration of muon ionization cooling. Thus, for many reasons, the plan that we have been asked to present will lay out a multi-year transition designed to rationally address these issues. We will identify the key elements of the MAP R&D effort that we feel should migrate into the GARD portfolio and also the critical deliverables that must be maintained as part of the transition. A final issue that will be explicitly addressed is the preservation of our most critical resource - the young and very talented members of our team who represent the future of accelerator physics.

Since our collaboration meeting begins in a few days, we will make time there to discuss these issues in much greater detail. I'm looking forward to having a chance to meet with each of you next week.

With Best Regards,
Mark