

20 October 2016

**Physics Advisory Committee**  
November 10-12, 2016

**CHARGE**

The laboratory continues to align its program with the recommendations in the Particle Physics Project Prioritization Panel (P5) report: *“Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context.”* Within this context, hosting the communities accelerator-based experimental neutrino program is a major thrust for the laboratory. In this meeting the PAC is asked to comment on issues that have emerged since the summer meeting and that are important to the success of the neutrino program, namely: the desirability of providing increased proton intensities for NOvA, the status of LBNF and the protoDUNEs, and a proposed “Run 3” for LArIAT.

In addition to the neutrino program, other areas in which there have been significant developments since the summer meeting include: plans for the laboratory’s contributions to the CMS Phase 2 upgrade, a potentially significant role for the laboratory in the ADMX experiment, and an evaluation of the value of the testbeam program to the community. We ask the PAC to provide advice and/or comment on these developments.

Specifically, we ask the PAC to consider the following:

**1. NOvA**

Neutrino oscillation results presented at the summer conferences have shown that if NOvA can produce timely results over the next few years, those results will be of great interest to the community. The prospects for NOvA being the first to make an important discovery depend upon the rate at which protons can be delivered to the NuMI target. We ask the committee to comment on the importance of trying to significantly increase proton delivery for the NOvA program in the coming years.

**2. LBNF and protoDUNEs**

i) We ask the PAC to comment on the current situation and on the progress being made.

- ii) Are the goals of the protoDUNE initiatives well defined, is the schedule achievable, and are the risks well understood?

### **3. LArIAT**

We ask the committee to comment on the LArIAT Collaboration's proposal to continue data taking in the latter part of FY 2017 (Run 3), and whether this initiative can be considered as part of a coherent LAr R&D program. Specifically:

- i) Is the proposed LArIAT Run 3 program unique and well motivated scientifically?
- ii) Is the proposed LArIAT Run 3 program well aligned with the needs of DUNE and the LAr neutrino community.
- iii) Is it likely that a continued LArIAT effort will take important effort away from the protoDUNE activities?

### **4. CMS Phase 2 Upgrade**

We ask the PAC to comment on the current situation and on the progress being made towards the laboratory's contributions to the CMS Phase 2 upgrade.

### **5. Axions**

Present axion searches cover an important region of parameter space. The laboratory is considering its potential role in future searches and how Fermilab scientists might contribute to extending the experimentally accessible parameter space. We ask the PAC to comment on the appropriateness and potential role of the laboratory in future axion searches.

### **6. Testbeam**

Over the last couple of years the laboratory has received advice from the Testbeam Committee to help guide the evolution for the Fermilab Testbeam Facility (FTBF). To better understand the case for continued operation of the FTBF, and the resources that should be invested in maintaining and enhancing the facility, the Testbeam Committee was recently been asked to assess and summarize the value of the FTBF to the community. Based on the Testbeam Committees findings, we ask the PAC to comment on the importance of

continued FTBF operation and the desirability of enhancing the facility.

## **7. Other**

The Director would welcome any comments the PAC has on any of the topics presented, or comments on aspects of the program beyond the presented topics.