

Physics Advisory Committee

July 6-9, 2017

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.”* In this meeting the PAC is asked to comment on current issues that are important to the success of the ongoing program and for planning for the future. The meeting in South Dakota will review pressing matters regarding beam allocation to the current and upcoming running experiments, their impact on the future neutrino program and the status of the latter.

Specifically:

1. Accelerator Prospects for FY18

We ask the committee to review the accelerator run plans and proton allocations for FY18 and comment on the impact on the scientific opportunities if it becomes necessary to significantly reduce the amount of running.

2. MicroBooNE: Lessons learned & FY18 Running

- i) The initial MicroBooNE request for $6.6E20$ POT has almost been fulfilled. The experiment is also approved for an additional $6.6E20$ POT in the “SBN era.” It was initially thought that this additional running would be coincident with the other SBN-experiment running. However, the BNB has performed sufficiently well to enable the initial request to be completed one year ahead of schedule. MicroBooNE is requesting continued running in FY18. We ask the committee to comment on the MicroBooNE plan for FY18 and beyond keeping in mind the goals of the experiment
- ii) We ask the committee to comment on the lessons learned from MicroBooNE to date and the plans to ensure effective utilization of the experience gained, keeping in mind that one of the motivations for the MicroBooNE experiment is to provide

experience and information that will help prepare for the LBNF/DUNE era.

3. SBN Update

We ask the PAC to comment on the status of preparations for the SBN program.

As the operational phase for the SBN near- and far-detectors draws closer it is important that the three SBN Collaborations develop the tools and operations-era organization to make the best use of the beam and to fully exploit the data from the three detectors including a unified oscillation analysis. We ask the committee to comment on the plans to accomplish this, the synergies among the experiments and the progress to date.

4. LBNF and DUNE

The LBNC reviews progress and gives advice on LBNF and DUNE. We ask the PAC to comment on recent progress. The near-term Fermilab neutrino program in general, and the SBN experiments in particular, are expected to help inform decisions that affect the preparations for the DUNE era. We ask the committee to comment on the process of identifying the important lessons from the SBN experiments and using these lessons to benefit the future program.

5. Preparing for the next P5

The next U.S. particle physics community planning process is expected to begin two or three years from now. The committee is asked to review the steps the Laboratory is taking and on steps the Laboratory should take to ensure adequate preparation for this process, including engaging the Fermilab community and the greater HEP community, and establishing and communicating what has to happen and when.

6. Quantum Systems

There is a Fermilab scientist effort on developing / exploiting quantum systems for future particle physics and particle-astrophysics experiments. We ask the committee to review these efforts to date and comment on the appropriateness and strategy for engaging in this

new area.

7. ANNIE proposal for FY18

We ask the committee to comment on the proposed ANNIE activities in FY18 and beyond.

8. SeaQuest / P-1039 Request/Proposal for FY18

Approved SeaQuest running has now been completed. The achievable beam quality for the experiment has enabled the experiment to exploit about one-third of the delivered beam, and hence record about one-third of the originally anticipated data sample. The SeaQuest / P-1039 (DY with polarized target) are considering requesting future running. We ask the PAC to comment on the SeaQuest/P-1039 status and plans, and on any explicit requests they may have for FY18.

9. 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.