

8 January 2016

Physics Advisory Committee

January 19-21, 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 the two major new initiatives for the Fermilab hosted neutrino program are LBNF/DUNE and the SBN program. A major focus for the present PAC meeting is to consider Stage 2 approval for the SBN program and consider the progress and next steps for LBNF/DUNE.

With limited budgets, programmatic choices must be considered to ensure adequate resources are available to keep approved projects on schedule. A second major focus of the meeting is to consider the scientific impact associated with these programmatic choices.

The P5 report identified the LHC experiments as the highest near-term priority. We ask the PAC to consider the present status and the laboratories contributions to CMS operations and the Phase 2 upgrade.

Finally, we ask the PAC to consider the status of the laboratories currently running leading experiments (NOvA and MicroBooNE), the completion of the MINOS+ experiment, the strategic plan of the Theory Department, and the status and vision of the Scientific Computing Division.

Specifically, we ask the PAC to consider the following:

1. Programmatic Choices

We ask the PAC to comment on the present set of programmatic priorities for the laboratory and give advice on the scientific impact of implementing various options that might be considered if resources are such that not everything in the program can be fully executed on the desired timescales.

2. LBNF/DUNE.

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

- ii) Are there adequate plans to address the issues raised at the last PAC meeting?
- iii) Are the goals of the protoDUNEs initiatives well defined, and does the laboratory have a plan to provide adequate support for the likely success of the protoDUNEs initiatives? Are the plans for protoDUNEs aligned with the needs of DUNE.

3. SBN Program

- i) We ask the PAC to advise on whether the SBN Program is ready for Stage 2 approval. Note that it is intended that a proposal to upgrade the BNB beamline will be considered at a later date.
- ii) Given the results from the Directors Review in December, does the PAC believe that, for Stage 2 approval, there is an adequate understanding of the resources required to execute the program? With the present understanding of the resources required, is the SBN program consistent with the P5 recommendations?
- iii) Is adequate progress being made towards coordinating plans for analysis across all three SBN experiments?
- iv) Does the progress to date on MicroBooNE give confidence that this experiment will fulfill its role in the SBN program?

4. CMS

- i) We ask the PAC to comment on the current situation and on the progress being made on CMS operations and the Phase 2 upgrade.
- ii) Are the contributions from Fermilab in support of these CMS activities consistent with the P5 plan?

5. NOvA, MicroBooNE, and MINOS+

- i) We ask the PAC to comment, for all three experiments, on the current situation and on the progress being made.
- ii) The timing of the switch from neutrino to antineutrino running affects all of the NuMI experiments. We ask the PAC to comment on the strategy NOvA is proposing to determine

when this switch will be made.

iii) MINOS+ is in its final year of data taking. We ask the PAC to comment on whether the experiment is likely to deliver on its basic physics goals given a realistic estimate of the final integrated POT.

iv) We ask the committee to comment on progress in MicroBooNE, the initial running of the experiment, and plans for the first physics results from the experiment.

6. Theory Strategic Plan

We ask the committee to comment on the theory strategic plan, its consistency with programmatic priorities, and plans to enhance the connections of the theory department with the neutrino program.

7. Scientific Computing Division Status and Vision

We ask the committee to comment on the SCD status, plans and vision, and their consistency with programmatic priorities. In particular, are the proposed activities in support of the neutrino program likely to be adequate for the success of the experiments within the program?

8. 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.