

Physics Advisory Committee

March 27-29, 2008

Draft Charge

1. Project X Physics Program

Over the winter of 2007/2008, the Laboratory and the US particle physics community developed a potential physics program associated primarily with the operation of the proton source represented by the Fermilab accelerator complex and possible enhancements including a new linear accelerator dubbed Project X. The Committee will hear a number of presentations which together will characterize that physics program. As a step along the way to crafting and shaping that program, the PAC is requested to evaluate that program. We envisage that this could happen in two stages:

- A. At this meeting, the PAC should continue its discussions from the November 2007 meeting and identify those areas in which they see a deficiency of information.

This could help the Laboratory to develop the case for the project.

- B. At the June meeting, the PAC would continue its discussions, possibly hear supplementary presentations and develop written recommendations that could be used by the Laboratory to shape the development of a staged physics program for the proton source.

2. Proposals/LOI/EOI

Notwithstanding the above discussion, the PAC will hear presentations on a number of projects and experiments which have already submitted documents to the Laboratory. As appropriate and with a different emphasis on each one, and taking cognizance of its deliberations about the overall program, the PAC should comment or recommend on the evolution of each of these projects.

A. P-974 MicroBooNE Proposal Addendum (B. Fleming)

The collaboration has submitted an addendum to its proposal which should clarify a number of the issues raised in the discussions in November 2007. This experiment is advanced as being on the path to a large liquid argon detector. It is envisaged as a hybrid experiment demonstrating both the physics capability and the technological path to larger-scale detectors.

The PAC is asked to consider this proposal and make a recommendation.

B. P-982 Letter of Intent: LAr5 – A Liquid Argon Neutrino Detector for Long Baseline Neutrino Physics (R. Rameika)

This Letter of Intent represents an initiative to establish a ~5 ktonne detector as a major step in the evolution of the US neutrino program. The practicality and potential of such a device will be presented.

The PAC is asked to comment on the potential of this research avenue.

C. P-975 Terascale Physics Opportunities at a High Statistics, High Energy Neutrino Scattering Experiment: NuSOnG (J. Conrad / P. Fisher)

In its discussions in the fall of 2007, the PAC expressed the desire to see a more developed physics case for the experiment which would use the Tevatron in a fixed-target mode. The experimenters have submitted an extensive discussion of the physics case.

The PAC should make a recommendation on the importance of this physics program.

D. P-981 Letter of Intent: Antimatter Gravity Experiment at Fermilab (AGE) (D. Kaplan / T. Phillips)

There has been considerable discussion/speculation about the residual potential of the Antiproton Source for future physics experiments. This Letter of Intent discusses one potential experiment but opens the broader question.

3. Status Reports

The Committee will hear status reports on the Fermilab accelerator complex and the currently operating experiments. The PAC is invited to comment.