

**Physics Advisory Committee Meeting  
Aspen, Colorado**

**June 18-21, 2007**

Charge  
June 10, 2007

**Introduction**

At this meeting, we will be focused on the longer term program of the Laboratory. However, the PAC will receive presentations on somewhat more current topics, as well. These will include accelerator operations, the collider program, and, on neutrinos, NOvA and the current and near-term experiments.

The Laboratory would welcome comments on the overall health of the program as appropriate.

**Strategic Planning and Steering Group**

Presentations will be made on strategic planning and the progress being made by the

- a) The Steering Group and
- b) Resource planning at the Laboratory.

The Committee is asked to comment on these initiatives. An extended discussion of, and comments on issues should prove useful.

**SuperCDMS 25 Kg - P-947**

At its last meeting, the PAC heard from the CDMS Collaboration, and "encourag[ed] submission of an updated proposal for Stage I approval of a SuperCDMS 25 kg project at Fermilab". The Director encouraged SuperCDMS to do this, noting that "An updated proposal based on what [CDMS] submitted to the agencies may be the appropriate instrument." We have now received copies of the proposals to the NSF and DOE, with a request that Stage I approval be granted.

Please consider the updated proposals and the physics reach of the SuperCDMS 25 Kg experiment in making a recommendation about granting Stage I approval for P-947.

## **Neutrino Physics Program**

The NOvA Project is progressing towards a DOE CD2/3A Baseline Review, which is currently expected in September. Evolution of understanding of the project costs along with the OMB-imposed cap of \$260M on the Total Project Cost leads to pressures and even reductions in the primary detector variable, its fiducial mass. Given this context, the PAC will hear a discussion from the NOvA Spokespersons of the goals and potential of the experiment.

In a separate presentation, the PAC will hear of the status of the SciBooNE and MINERvA initiatives.

Please comment and advise, as seems appropriate, on these elements of Fermilab's neutrino program.

## **Physics Program at the Tevatron Collider**

The Tevatron Collider experiments have continued to use the increasing luminosity delivered, and look for even higher rates into the future. At the previous PAC, presentations were made of the status of the physics results. At the time of this PAC, P5 will have heard from the Laboratory and the experiments about the status of the Tevatron itself and the effort available in the experiments. We may also have some sense of the reaction from P5. It is expected that there will be a recommendation that the Tevatron and the experiments be operated through FY2009.

At this time it is appropriate to consider the possibility of running the Tevatron Collider program in 2010 and beyond. We have asked Scott Willenbrock to prepare a discussion of the case for such. It is anticipated that P5 may start to think about this issue in the Fall of 2007 in order to provide advice to DOE by spring 2008.

The PAC should consider the different aspects of the situation, the physics prospects of the Tevatron experiments, the LHC schedule and any other cogent factors and should offer a perspective on this issue.

## **ILC Detector/Physics Efforts**

The Deputy Director has formed a group charged with expanding the involvement of Fermilab in the broader physics and detector issues of the ILC in addition to, but integrated with the detector and test beam efforts. A report from this group will be presented.

The PAC is asked to comment on this initiative.

## **The LHC Experiment Upgrades**

The CMS Experiment has submitted an Expression of Interest to CERN and is requesting the engagement of the LHCC in discussion of upgrades. The imagined timescales are 2011-2012 for intermediate scale tracking upgrades, and 2016 for more extensive upgrades. US CMS (and US ATLAS) have informed the DOE of their intent to participate. Fermilab is the host laboratory for US CMS. R&D work with resources from the Research Program is already underway. The laboratory will discuss how it might be involved in the process by which this program can be nurtured and overseen.

The PAC should comment on the issues raised.

## **Detector and Computing R&D**

The ILC Detector R&D community is trying to develop a possible roadmap for detectors in the coming years, with the aim of having detector Engineering Design Reports (EDRs) produced in 2010 in parallel with the machine EDR. Support for this R&D in the Universities is managed directly by OHEP; but independent contributions have come from the Laboratories.

There have been R&D efforts at Fermilab, BNL and SLAC associated with the neutrino program. For example Fermilab has been supporting Liquid Argon detector R&D. BNL has provided support for Water Cherenkov R&D aimed at a DUSEL experiment. Recently Fermilab has been approached about supporting this latter R&D as well.

In Particle Astrophysics, there has been R&D associated with Dark Matter experiments. Fermilab has supported CDMS, without completely taking over the experiment. It has also supported COUPP as a result of local initiatives. Informal contacts and comments from the university groups working on Noble Liquid research in this area suggest a need for Laboratory-scale participation.

With funding at its present level FNAL cannot support all possible R&D in US Particle Physics and DOE-HEP supported particle astrophysics. Nevertheless, a broader role, in line with a larger relative role in US particle physics may be called for.

The PAC will hear presentation(s) delimiting the current scope of Detector and Computing R&D and setting up a discussion.

The PAC should provide advice on the current approach of the laboratory and the extent to which it considers a broadening of scope desirable.

## **The Accelerator Physics Center**

At its March meeting the PAC heard about the Particle Astrophysics and the CMS Centers. The Accelerator Physics Center is also being formed to provide a focus for accelerator physics R&D. The work in that center falls under the auspices of the Accelerator Advisory Committee, nevertheless, it will be an important aspect of Fermilab accelerator work in the future. A presentation about this new center will be provided.

The PAC should be informed of this new development and is invited to comment as it desires.