

FCPA Retreat

Introduction

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Focus of the Retreat

- Preparation for the DOE review of non-accelerator physics (late September)
 - Take stock of our current and planned program
 - Identify strengths and weaknesses
 - Hone our message to the national community
- Identify any Center issues that need discussion

The Charge

- 1) Is the science compelling and within the DOE OHEP mission?
- 2) Is our experimental program leading the field, or at least competitive?
- 3) Identify the FNAL roles (scientific, technical and management) in the experiments. Are they leading, or at least significant?
- 4) What is the future role of FNAL in this area? Are we positioned to be a leader?
- 5) What are the weaknesses of our program in this area? How should we address them?
- 6) How does Fermilab serve the broader national and international community? Are we valued contributors in our collaborations? Why is Fermilab participation needed for success?

Core Program as seen by DOE

- Dark Matter
 - CDMS, COUPP
- Dark Energy
 - SDSS, DES
- Cosmic Rays
 - Auger South
- Theory

Initiatives we want to pursue

- Dark Matter
 - DarkSide, DAMIC
- Dark Energy
 - 21 cm BAO, JDEM, BigBoss, LSST
- Cosmic Rays
 - Auger North
- CMB
 - QUIET II
- Axions
 - Chase, Resonant Regeneration
 - Solid Xenon
- Holometer

The Landscape at FNAL

- Base funding (KA 13) only covers scientists and operations for SDSS, COUPP, DES, CDMS, Auger South and some small R&D effort. Currently we are about \$650K short (~5 FTEs) of covering everything we are doing! Have used carryover funding in FY2009/FY2010, but this trick will no longer work starting in FY2011!
 - Managed by FCPA, in conjunction with the Divisions
- Detector R&D (KA 15) covers technical labor (but NOT scientists) and M&S for generic detector research and development (but NOT experiments).
 - Managed by PPD and CD, in consultation with FCPA

The DOE view

- Projects that are supported
 - Dark matter (CDMS, COUPP), Dark Energy (SDSS, DES), Cosmic Rays (Auger) and Theory
 - Small level of R&D towards future experiments in these areas
- Initiatives that DOE considers acceptable for us to work on for now
 - SuperCDMS, COUPP 60 kg, JDEM
- Initiatives for which we have submitted proposals
 - SuperCDMS SNOLAB R&D, DarkSide, COUPP 60 kg, QUIET II, JDEM R&D (LBNL)
- Initiatives which need additional advice before proceeding
 - Auger North, Holometer
- Initiatives which need more time to mature before proposals
 - 21 cm BAO, JDEM/BigBoss/LSST, Axion experiments

Where does FCPA fit in?

- Driving force behind particle astrophysics at FNAL
- Scientific and physical home for most FNAL scientists working in particle astrophysics
- Administrative home for Craig, Dan, Seton, 8 experimental research associates and visitors.
- Technical labor, project/financial/admin support are still located in the Divisions. Experimental Physics Projects (EPP) is the administrative home for most of our PPD scientists. For CD, it is the Experimental Astrophysics Group (EAG).
- This organizational structure is being reviewed and may change in the near future.

What is the DOE review we are facing?

- DOE cycles through each of their 'KA' categories every three years, reviewing the national laboratory program in each. Theory had their turn two years ago, and last year was proton research and detector R&D. It's the turn of 'non-accelerator physics' (KA 13) this fall.
- The review panel is mostly University scientists, some of whom will be quite skeptical about the research program at national laboratories. The labs also compete with one another for \$\$.
- Experience has shown that these reviews quickly pounce on the weaknesses in each program and funding tends to be reduced if good justifications aren't available.
- FNAL currently has about 30% of the DOE budget for particle astrophysics. When DECAM is finished, we would like to keep a substantial fraction of those project funds for our upcoming projects (mainly in dark matter).

Example provocative ?'s to ask today

- Are we pursuing too many (or too few) dark matter direct detection experiments? Are they the right ones? Should we consider involvement with indirect detection?
- What's the right path towards understanding dark energy after DES? Is it towards larger, more-expensive surveys, or should we be thinking outside the box (ala Chris Stubbs)? Is 21cm BAO the answer?
- Are there cheaper alternatives to the Auger 'northern array' approach that we should pursue to study cosmic rays?
- Can we be a major player in CMB polarization and is QUIET II the right experiment for this?
- Is the science case behind our axion efforts sufficient to justify them in light of other particle astrophysics priorities?
- Would it make sense to pursue the holometer experiment if GEO600 no longer detected mystery noise at high frequencies?

Retreat Format

- Conveners were asked to gather presentations by topic (dark matter, dark energy, cosmic rays, CMB, axions, holometer).
- Presenters have been requested to address the 6 key questions and to leave plenty of time for discussion. We strongly encourage you to raise friendly and constructive criticisms during these presentations.
- Late afternoon session to summarize and identify list of our weakest points, so that we can work on those prior to the DOE review.
- We will leave time at the end of the day for people to voice any additional topics of concern to the whole Center.