Lester H. Miller

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EDUCATION

Stanford University, Stanford, CA October 2000
Ph.D. in Physics, research in Experimental Particle Physics
Thesis: The Palo Verde Neutrino Oscillation Experiment

Harvard University, Cambridge, MA June 1995
B.A. in Physics, cum laude

AWARDS

Achievement Rewards for College Scientists Fellowship, 1998-2000.
National Merit Scholar, 1990.

WORK EXPERIENCE

CDF Collaboration (Post Doc, Harvard Group) 2000-present

CDF, Collider Detector Facility, is one of two detectors on the 1.96 TeV Tevatron collider at Fermilab. We are currently midway through Run II, a data taking phase which began in 2000 after extensive upgrades to both the detector and the accelerator complex. The goal is to collect 4 to 8 fb^{-1} of data before LHC startup.

- Top quark cross section: One of the discovery channels for the top quark at CDF was in events with a W boson, jets, and a soft muon B-tag. We have redone this measurement with a similar size dataset in Run II, and are readying for publication a result using 200 pb^{-1} of data.
- SVXII silicon tracker: I was extensively involved in the commissioning of the new 750k channel central silicon tracker. I headed a group responsible for identifying new failure modes, addressing them with appropriate bench studies, and coordinating responses to either address them with accesses or mitigate them through changed running conditions.

The Palo Verde Neutrino Oscillation Experiment (*Prof. Giorgio Gratta's group*) 1996-2000

The Palo Verde experiment, a collaboration of 10 physicists from four universities, was a one kilometer baseline reactor neutrino oscillation experiment at the Palo Verde nuclear power plant in Arizona whose goal was to measure the mass of the neutrino. The Stanford group was involved in virtually all aspects of the experiment. My specific duties as the only student in the collaboration included:

- Creating a Monte Carlo simulation of the detector to understand its signal response and neutrino detection efficiency. This included a detailed model of scintillator response, light transport, and phototube pulse shape for accurate matching of simulation to measured trigger efficiency and position/energy reconstruction.
- Performing statistical data analysis (Feldman and Cousins method) to determine the 90% confidence level sensitivity of the data set to neutrino mass measurement, including estimating the systematic uncertainties inherent in the data.
- Calculating daily the reactor neutrino flux using Palo Verde databases in conjunction with Combustion Engineering core simulation code.
- Prototyping and testing of high performance phototubes used in the detector in conjunction with Electron Tubes Inc.
- Implementing a fast pattern recognition trigger using a field programmable gate array and supporting logic.

Lab Assistant, Advanced Physics Lab, Stanford University. 1998

A group of nine students designed and built a spark chamber for cosmic muon detection. I guided three students in the design and construction of trigger logic using plastic scintillator in various coincident combinations to trigger on different event structures. (The class successfully built the chamber.)

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PUBLICATIONS AND PRESENTATIONS

L. Miller for the CDF Collaboration, “Status of the CDF Silicon Detector”, *Nucl. Instr. Meth.* A 518 (2004) 281-285.

“Results from Palo Verde and Future Prospects”, talk presented at the XXXVth Recontres de Moriond Electroweak and Unified Theories, Savoie, France.

“The Palo Verde Experiment and Future Prospects in Reactor Neutrinos”, CERN EP Seminar, March 2000, CERN.

“The Palo Verde Neutrino Oscillation Experiment”, talk presented at the 1999 APS Centennial Meeting, Atlanta, GA.

“Reactor Neutrino Oscillation Experiments”, talk presented at PASCOS 1998, Boston, MA.

Palo Verde Collaboration, “Final results from the Palo Verde neutrino oscillation experiment,” *Phys. Rev.* D 64 (2001) 112001.

Palo Verde Collaboration, “Neutron production by cosmic ray muons at shallow depth,” *Phys. Rev.* D 62 (2000) 092005.

Palo Verde Collaboration, “Results from the Palo Verde neutrino oscillation experiment,” *Phys. Rev.* D 62 (2000) 072002.

Y.F. Wang, L. Miller, G. Gratta, “A new approach to background subtraction in low-energy neutrino experiments,” *Phys. Rev.* D 62 (2000) 013012.

Palo Verde Collaboration, “Search for neutrino oscillations at the Palo Verde nuclear reactors,” *Phys. Rev. Lett.* 84 (2000) 3764-3767.

G. Gratta, L. Miller, C. Roat, D. Tracy, Y.F. Wang, “A fast programmable trigger for pattern recognition,” *Nucl. Instr. Meth.* A 400 (1997) 456-462.