

COLLOQUIUM

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Neutrino Physics and the PROSPECT Experiment

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Abstract

Neutrinos, the most ghostly of Standard Model particles, were first conclusively detected by Clyde Cowan and Frederick Reines in 1956. Although these particles are included in the Standard Model, their properties such as mass and mixing parameters are not predicted and must be measured. Ever since their discovery, physicists have been trying to piece together a comprehensive understanding of the neutrino and over the past 6 decades a nearly complete picture has emerged. However, there are still some undetermined parameters as well as phenomena that have resisted explanation. One of these unexplained phenomena that has arisen rather recently termed the "reactor antineutrino anomaly" is the deficit in the measured flux of antineutrinos from nuclear reactors relative to the expected flux from calculation. PROSPECT, the Precision Reactor Oscillation and Spectrum experiment, currently taking data at Oak Ridge National Lab, aims to shed some light on this mystery by measuring the flux a few meters from the core of a nuclear reactor. In so doing, many obstacles had to be overcome, not the least of which was designing a detector that could isolate antineutrino events from huge backgrounds inherent in the environment at the surface of the Earth and next to a reactor. In this talk, I will give a brief history of neutrinos and how their properties were determined highlighting some key experiments. Special emphasis will be given to the PROSPECT experiment with recent data and analysis shown

Monday, September 24, 2018 at 3:00 pm

SERC, Room 116

Refreshments served at 2:45