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## Project Poltergeist A Ghostly Neutrino and a Specter

Department of Physics Colloquium



WISCONSIN

It is not quite Halloween yet... In this talk we will discuss how Project Poltergeist shaped neutrino physics for decades to come and made nuclear reactors the workhorse of early oscillation searches. A renaissance of reactor neutrino experiments around 2010 lead to the very precise measurement of one of the mixing parameters,  $\theta_{13}$  -- in the run-up to this measurement flux calculations from the 1980's were scrutinized and surprisingly the flux was found to be higher than previously expected leading to the so-called reactor anomaly. The reactor anomaly points a type of neutrino even more elusive than regular neutrinos, the ghostly sterile neutrino. We will review the calculations performed so far and highlight some of the open questions. In the final part of the talk we will point out how current attempts to settle the question of the sterile neutrino will impact our future ability to use neutrinos to peer into the cores of nuclear reactors to safeguards against the diversion of plutonium, which may play an important role in banishing the specter of nuclear terrorism.