

Columbia University Department of Physics

High Energy Particle Seminar Series



“A NEW PROBE OF THE STERILE NEUTRINO”

A number of observed anomalies in neutrino oscillation experiments can be explained by the existence of a new fundamental particle called the sterile neutrino. A definitive experiment is needed in order to determine if such a particle exists or not. A detector placed ~ 100 m from an intense source of >3 GeV protons can be used to search for electron neutrino appearance with the monoenergetic 235.5 MeV muon neutrino flux from charged kaon decay-at-rest. Such an observation would be consistent with the existence of at least one sterile neutrino. The detector can also be used to concurrently search for the appearance and disappearance of neutrinos and antineutrinos from pion/muon decay-at-rest as well.



The combination of these measurements

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would be a definitive probe of the sterile neutrino with neutrinos and antineutrinos and in both appearance and disappearance channels. I will present the kaon decay-at-rest sterile neutrino search idea and the possibility of experimentally pursuing it in the near future.