Abstract Submitted
for the APR07 Meeting of
The American Physical Society

Measuring Active-Sterile Neutrino Oscillations with a Stopped Pion Neutrino Source[1] RICHARD VAN DE WATER, BILL LOUIS, GEOFF MILLS, Los Alamos National Laboratory — The question of the existence of light sterile neutrinos is of great interest in many areas of particle physics, astrophysics, and cosmology. Furthermore, should the MiniBooNE experiment at Fermilab confirm the LSND oscillation signal, then new measurements are required to identify the mechanism responsible for these oscillations. Possibilities include sterile neutrinos, CP or CPT violation, variable mass neutrinos, and Lorentz violation. Here we consider an experiment at a stopped pion neutrino source (the Spallation Neutron Source at ORNL) to determine if active-sterile neutrino oscillations with Δm^2 greater than 0.1 eV^2 can account for the signal. By exploiting stopped π^+ decay to produce a monoenergetic ν_μ source, and measuring the rate of the neutral current reaction $\nu_x\ ^{12}C \rightarrow \nu_x\ ^{12}C^*(15.11)$ as a function of distance from the source, we show that a convincing test for active-sterile neutrino oscillations can be performed.

[1]This research was supported by LDRD funding at LANL

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Date submitted: 09 Jan 2007 Electronic form version 1.4