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Measuring Active-Sterile Neutrino Oscillations with a Stopped Pion Neutrino Source RICHARD VAN DE WATER, GERRY GARVEY, ANDREW GREEN, WILLIAM LOUIS, GEOFF MILLS, HEATHER RAY, RICHARD SCHIRATO, HYWEL WHITE, Los Alamos National Laboratory — The possible 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, Lorentz violation, and extra dimensions. In this paper, we consider an experiment at a stopped pion neutrino source to determine if active-sterile neutrino oscillations with Δm^2 greater than 0.1 ev 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 $\nu_x\ ^{12}\mathrm{C} \rightarrow \nu_x\ ^{12}\mathrm{C}^*(15.11)$ as a function of distance from the source, we show that a convincing test for active-sterile neutrino oscillations can be performed.

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