



Contribution ID: 5

Type: Oral

CENNS: A new method for measuring Coherent Elastic Neutrino Nucleus Scattering

Friday, 6 June 2014 14:00 (20 minutes)

A recent study showed background limits to future dark matter searches coming from Coherent Elastic Neutrino Nucleus Scattering (CENNS) interactions of astrophysical and atmospheric neutrinos. There are a few possible ways to improve the limits by using directional measurements of the neutrino interactions and/or measuring time variation of the interactions. However, this CENNS background limit is a robust lower bound which can not be substantially reduced. Measuring the CENNS cross section and performing subsequent tests of higher energy neutrino interactions on various target materials will be extremely beneficial to future dark matter experiments.

We present an experimental method for measuring the process of CENNS. This method uses a low-energy threshold detector situated transverse to a high energy neutrino beam production target. This detector would be sensitive to the low energy neutrinos arising from pion decays-at-rest in the target. In this talk we will present the results of the beam induced background measurement, detector R&D and systematic uncertainties.

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Session Classification: II.c Neutrino

Track Classification: Experiments: 2c) Detectors for neutrino physics