



Contribution ID: 421

Type: **Poster**

Studying neutron backgrounds for COHERENT detectors with MARS

The COHERENT collaboration has made the first observations of coherent elastic neutrino-nucleus scattering (CEvNS) in multiple detectors. These observations depend on the decay-at-rest neutrino production at the Spallation Neutron Source (SNS) at Oak Ridge National Laboratory, but must contend with the substantial neutron production of the SNS. Small nuclear recoils are the observable signature of CEvNS, and our detectors are therefore sensitive to neutron interactions causing a similar recoil signal. To characterize the neutron background, we use a dedicated neutron monitoring system: the Multiplicity and Recoil Spectrometer (MARS). A mobile, gadolinium doped plastic scintillator, MARS is capable of mapping out the neutron flux within the space constraints of the basement hallway housing the COHERENT detectors. This poster will discuss the current data and our plans for MARS as COHERENT progresses towards precision CEvNS measurements.

Mini-abstract

A Gd-doped plastic scintillator, MARS, provides neutron flux data for detector background studies.

Experiment/Collaboration

COHERENT

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Session Classification: Poster Session 1