



Contribution ID: 252

Type: **Oral Presentation**

COHERENT Plans for D2O detector at the Spallation Neutron Source

Thursday 1 August 2019 14:20 (15 minutes)

The Spallation Neutron Source (SNS) is a pulsed source of neutrons and, as a byproduct of this operation, an intense source of neutrinos via stopped-pion decay. The COHERENT collaboration uses this source to investigate coherent elastic neutrino-nucleus scattering (CEvNS) with a suite of detectors. To enable precise cross-section measurements, we plan to reduce an estimated 10% uncertainty in our flux calculation associated with the lack of data for π^\pm production from 1 GeV protons on an Hg target. We present here our Geant4 simulation of neutrino production at the SNS and our plans to experimentally normalize this flux with the development of a 670 kg D₂O detector. Using the precise cross section calculations for neutrino interactions on deuterium, we will dramatically reduce our flux uncertainty.

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Session Classification: Neutrino Physics

Track Classification: Neutrino Physics