

CEvNS at CSNS in China

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The detection and cross section measurement of Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) is vital for particle physics, astrophysics and nuclear physics. In 2017 the COHERENT collaboration reported the first observation of CEvNS signal. A new CEvNS detection experiment is under our schedule. Four pure CsI crystals, weight 3kg and coupled with two Photon Multiplier Tubes (PMTs) each, will be cooled down to 77K and placed at China Spallation Neutron Source (CSNS) to detect the CEvNS signals produced by neutrinos from stopped pion decays happening within the Tungsten target of CSNS. Owing to the extremely high light yield of pure CsI at 77K (33.5PE/keVee), even though only having a neutrino flux 30% weaker than COHERENT, the detectable signal event rate is still expected to be 540 each year. Low radioactivity materials and devices will be used to construct the detector and strong shielding will be applied to reduce the radioactive background. Dual-PMT readout will be able to reject PMT-related background like Cherenkov light and PMT dark noise. With all the strategies above, we are hoping to reach a signal to background ratio exceeding 4.

We have been using two EJ301 liquid scintillator detectors to investigate the beam related and unrelated background at the location. Our main detector is scheduled to be placed there as soon as CSNS finish their upgrade this summer.

Attendance type

Virtual presentation

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