



Contribution ID: 31

Type: Oral

Neutron capture event selection using light and charge matching in the second DUNE Far Detector (FD2) module prototype at CERN

Wednesday 28 August 2024 10:00 (20 minutes)

Neutrons from the cavern in the DUNE Far Detector present a significant background in the low energy regime of a few MeV. Additionally, neutrons appear as the final state product in many low energy neutrino interaction channels in argon. Identifying the neutron capture signature is crucial for the DUNE low energy program. Neutron capture in argon releases a cascade of gamma rays, with the total energy summing to a monochromatic 6.1 MeV, making it a viable candidate for absolute energy scale calibration. The DUNE FD2 prototype uses X-ARAPUCA technology for photon detection and Charge Readout Planes (CRPs) for charge detection. The same X-ARAPUCA technology and CRPs will be used for the DUNE FD2 light and charge readout. A commercial pulsed neutron source was used to generate a beam of neutrons. As the neutrons enter the active volume, a fraction of them is captured by argon, releasing a gamma cascade, which produces light and charge detected by the Photon Detection System (PDS) and the CRPs, respectively. In this talk, the initial results of neutron capture signature identification in liquid argon at the DUNE FD2 prototype will be presented.

Primary author: PAUDEL, Ajib (Fermi National Accelerator Lab. (US))

Presenter: PAUDEL, Ajib (Fermi National Accelerator Lab. (US))

Session Classification: Signal reconstruction and identification

Track Classification: Signal reconstruction and identification (analysis methods, simulations): Analysis methods