

## Mini-CAPTAIN measurements in the LANSCE WNR Neutron Beam

All neutrino experiments face the problem of reconstructing the incoming neutrino energy using the visible interaction products. Unfortunately, the initial neutrino interaction is not well understood, not all of the interaction products are visible, and the secondary interactions may not be well understood. In preparation the analysis of neutrino oscillation data collected using liquid argon time projection chambers, the CAPTAIN collaboration is addressing this problem with a measurement of the cross section of neutrons impinging on an argon target. Using the WNR neutron facility, which produces a well known flux of neutrons up to a kinetic energy of 800 MeV, the total cross section will be measured for neutron kinetic energies above approximately 50 MeV, and partial cross sections will be measured for  $n + \text{Ar} \rightarrow p + X$  and  $n + \text{Ar} \rightarrow \pi^\pm + X$ . Data for this measurement was collected during the Summer of 2017 using a 400 kg fiducial Liquid Argon TPC that was instrumented with a photon-detection system (PDS). The interaction by interaction neutron energy is determined using time of flight as determined by the PDS while the ionization yield is measured in the TPC.

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