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Determining neutron multiplicity from neutrino interactions with ANNIE

A hundred meters downstream within the Booster Neutrino Beam at Fermilab lies the Accelerator Neutrino Neutron Interaction Experiment (ANNIE for short), a 26 ton gadolinium-doped water Cherenkov detector, measuring the neutrino interaction cross section in water and the final state neutron multiplicity as a function of momentum transfer. Besides improving the systematic uncertainties of future long-baseline neutrino detectors with its results, ANNIE also serves as a testbed for upcoming technologies in particle experiments: The ongoing Phase-II of the project will see the deployment of novel light sensors, the so called Large Area Picosecond Photodetectors (LAPPDs) for enhanced time resolution below 100 picoseconds while the near future will have an additional detection volume filled with water-based liquid scintillator submerged into the tank. This presentation details the current status of ANNIE during its first Phase-II data taking, show past and present work conducted on LAPPDs and outline future plans for the experiment itself and beyond.

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Collaboration / Activity

ANNIE

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