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The ANNIE Experiment

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The Accelerator Neutrino Neutron Interaction Experiment (ANNIE) at Fermilab uses 30 tons of gadolinium-enhanced water to capture and detect the otherwise invisible neutrons produced in complex neutrino-nucleus interactions in addition to traditional water-Cherenkov charged particle detection. The number of these final-state neutrons help constrain the interaction type and the kinematics of the target nucleus, which are major sources of uncertainty in neutrino interaction event simulation and reconstruction. The Phase I run measured background neutrons associated with the neutrino beam, including “dirt neutrons” from neutrino interactions outside the detector and “skyshine neutrons” from the beam which scatter into the experimental hall. This talk will discuss the ANNIE experiment, science goals and the implications of the Phase I results.

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