

ANNIE: Accelerator Neutrino Neutron Interaction Experiment

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Neutron tagging in Gadolinium-doped water may play a significant role in reducing backgrounds from atmospheric neutrinos in next generation proton-decay searches using Megaton-scale Water Cherenkov detectors. A similar technique is also useful in the detection of Supernova neutrinos. In this talk we discuss the Accelerator Neutrino Neutron Interaction Experiment (ANNIE), designed to measure the neutron yield of neutrino interactions in gadolinium-doped water. An innovative aspect of the ANNIE design is the use of precision timing to localize interaction vertices in the small fiducial volume of the detector, which will be achieved by using early prototypes of LAPPDs (Large Area Picosecond Photodetectors). The ideas explored by ANNIE could have a transformative impact on Water Cherenkov, scintillation, and other photodetection-based neutrino detector technologies.

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