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The Atmospheric Neutrino Neutron Interaction Experiment (ANNIE) MATTHEW WETSTEIN, University of Chicago — 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. Similar techniques might also be useful in the detection of Supernova neutrinos. Accurate determination of neutron tagging efficiencies will require a detailed understanding of the number of neutrons produced by neutrino interactions in water, as a function of momentum transferred. In this talk we present the proposed Atmospheric Neutrino Neutron Interaction Experiment (ANNIE), designed to measure the neutron yield of atmospheric neutrino interactions in gadolinium-doped water. We will introduce some of the physics motivations for this measurement as well as the novel technological aspects. One important component of the ANNIE design is the use of precision timing to localize interaction vertices in the small fiducial volume of the detector. To achieve this, we propose to use early prototypes of LAPPDs (Large Area Picosecond Photodetectors), now in the commercialization phase. These photosensors and their status will also be discussed.

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