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aCORN: A Measurement of the Beta-Antineutrino Correlation in Neutron Decay[1]

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The aCORN experiment has measured the electron-antineutrino angular correlation coefficient (the "a" coefficient) in free neutron decay. aCORN uses the dependence of the recoil proton momentum on the opening angle between the electron and the neutrino to form an asymmetry. The apparatus accepts decays where the antineutrino is restricted to two momentum groups having equal solid angle. In this geometry, proton time of flight distinguishes between decays with a large or small opening angle between the electron and the antineutrino. The correlation coefficient is determined from the asymmetry between two branches of the time of flight spectrum. The asymmetry was measured on the NG-6 neutron beam at the NIST Center for Neutron Research (NCNR), and a subsequent measurement has been started on the higher flux NG-C beam. An overview of the method and systematic effects will be presented, including results from the NG-6 dataset.

[1]National Science Foundation

[2]On behalf of the aCORN Collaboration.