

Abstract Submitted
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Analysis of Hodoscope Efficiencies for E1039/SpinQuest Spectrometer using Cosmic Rays¹ NATE ROWLANDS, Abilene Christian University, SPINQUEST COLLABORATION — SpinQuest (E1039) at Fermi National Accelerator Laboratory is trying to help understand the spin structure of the nucleon sea using the 120 GeV proton beam and polarized NH₃ and ND₃ (ammonia) solid targets to provide the polarized hydrogen and deuterium. It uses the Drell-Yan process to access the nucleon sea via quark-antiquark pairs annihilating into a virtual photon, which decays into a $\mu^+ \mu^-$ pair. Scintillator hodoscope planes provide the primary trigger, so understanding their efficiency is critical for the science goals of SpinQuest. This is achieved by counting the number of single track events that hit all eight planes vs the events with hits in seven or fewer planes. The goal is to have 99% efficiency for every hodoscope plane. Initial studies of this technique are being done using cosmic rays. This analysis will measure efficiencies for single muon events. Thus a verified technique of measuring hodoscope efficiencies will be in place when SpinQuest begins engineering runs by November, 2019 and data taking by early 2020.

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