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New Measurements of Neutron-Neutron Quasifree Scattering in Neutron-Deuteron Breakup[1] RONALD MALONE, ALEXANDER CROWELL, LAURIE CUMBERBATCH, BRENT FALLIN, FORREST FRIESEN, CALVIN HOWELL, COLLIN MALONE, ETHAN MANCIL, DAVID TICEHURST, WERNER TORNOW, Duke University, BENJAMIN CROWE, DIANE MARKOFF, North Carolina Central University, HENRYK WITALA, Jagiellonian University — The neutron-deuteron (nd) system is a rich environment for testing models of nucleon-nucleon and three-nucleon (3N) interactions. Ab-initio calculations of 3N scattering observables accurately describe most experimental data. One exception is the cross section for neutron-neutron (nn) quasifree scattering (QFS) in nd breakup. Recent measurements of this cross section reveal that theory underpredicts the data by more than 15%. These results imply charge-symmetry breaking at a level higher than expected. We have conducted two new measurements of the nn QFS cross section. In the first experiment an uncollimated beam of 10.0 MeV neutrons was used. The second experiment was performed with a collimated beam of 15.6 MeV neutrons. Time-of-flight techniques were used to determine the energies of the breakup neutrons detected in coincidence. Our measurements differ from previous experiments in that the beam-target luminosity was determined from the nd elastic scattering yields measured concurrently with the breakup yields. Experimental methods and results will be discussed.

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