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Measurements of the first polarized ultracold neutrons at TRIUMF

Thursday 6 June 2019 14:30 (15 minutes)

During an experimental run in fall 2018 with the ultracold neutron (UCN) source at TRIUMF we created polarized UCN by passing them through a thin magnetized iron foil. This talk will describe results of measurements of the UCN polarization and spin flipping efficiency measured by the TRIUMF Ultracold Advance Neutron (TUCAN) Collaboration using a pair of these foils and a pair of identical spin flippers. TUCAN is a collaboration between Canadian and Japanese researchers to search for sources of CP-violation in the form of a fundamental neutron Electric Dipole Moment (nEDM). The nEDM changes the Larmor frequency of neutrons precessing in a magnetic and electric field by an amount proportional to the electric field. Measuring this frequency difference is at the heart of the nEDM Measurement and uses UCNs in two electric fields state, parallel and antiparallel to a magnetic field. The statistical error in the nEDM measurement can be minimized by achieving the highest possible neutron polarization and spin state analysis efficiency. A simultaneous spin analyzer (SSA) system increases the spin analysis efficiency of UCNs by reducing the time that one of the spin states is stored above the detector. The spin analyzer components we characterized are a part of a SSA system that is being tested for the future nEDM measurement.

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