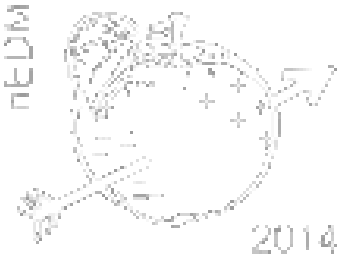

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Superconducting Quantum Interference Device (SQUID) applications in the SNS nEDM Experiment

Wednesday, 5 November 2014 15:00 (20 minutes)

The SNS nEDM experiment will have two readout methods built into the apparatus: the "dressed spin" method, in which a strong non-resonant RF field is applied to match the effective neutron and helium-3 (co-magnetometer) gyromagnetic ratios; and the "free precession"method, in which the RF field is off and the precession of the helium-3 magnetization is directly detected with SQUID-based gradiometers. In both methods, the neutron spin analysis is performed continuously by the spin-dependent n + 3He capture reaction, which creates scintillation light in the ambient superfluid 4He. In this talk, I will discuss practical considerations of implementing low-noise SQUID gradiometers into the SNS nEDM apparatus and show results of a series of tests of a candidate SQUID system in a mock-up apparatus, including a reference channel method to reduce unwanted signals from the 3He precession measurement. I will also describe a multi-channel SQUID based scanner for magnetic impurities in room-temperature samples, which could be used to qualify materials for installation into the central detector of a nEDM apparatus.

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