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MAGNETIC SHIELDING FOR AN EXPERIMENT TO MEASURE THE n – ^{4}He WEAK INTERACTION, Jay D. Tasson, Physics Department, Northern Michigan University, 1401 Presque Isle Avenue; Marquette, MI, jaytasso@nmu.edu, W. Michael Snow*, Indiana University Cyclotron Facility, 2401 Milo B. Sampson Lane; Bloomington, IN, snow@iucf.indiana.edu.

An experiment is being prepared to measure the weak interaction between neutrons and ^{4}He. The experiment is conducted by passing a beam of polarized neutrons through a vessel of superfluid helium during which the weak interaction will cause a rotation in the neutrons' spin. The experiment was done previously with inconclusive results. The goal in redoing the experiment is to reduce the uncertainty in the measurement to the point where the effect is observable. One of the ways the uncertainty will be reduced is by excluding magnetic fields from the experimental region to a greater degree. This is necessary since neutrons have a magnetic moment and will precess about a magnetic field perpendicular to their magnetic moment.

When the experiment was conducted previously, magnetic fields within the experimental region were limited to less than 100μG using two cylindrical mumetal magnetic shields as well as a set of solenoid coils designed to cancel the residual field. When a third shield is used in addition to the original two, the 100μG level is reached with shields alone. The level will be further reduced by cooling the new shield to liquid helium temperatures and incorporating a redesigned set of solenoid coils.