



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 3203

Type: Oral (Non-Student) / Orale (non-étudiant(e))

Magnetic resonance requirements and shim coil design for the TUCAN EDM experiment

Monday, 6 June 2022 17:00 (15 minutes)

The TUCAN EDM experiment aims to measure the neutron electric dipole moment (EDM) to a precision of 1×10^{-27} ecm. The experiment is a precise relative measurement of the spin precession frequency of ultracold neutrons stored in a bottle, placed in homogenous magnetic and electric fields. The magnetic field is shielded from external influences by conducting the experiment in a magnetically shielded room (MSR). A main precession field of $B_0 = 1 \mu\text{T}$ is produced by an internal coil. Magnetic field inhomogeneity in the coil/MSR system will cause the neutron spins to dephase as they precess, reducing the statistical precision of the experiment. Controlling the homogeneity is also important for false EDM signals. A system of square shim coils, mounted on the surface of a cube surrounding the experiment, is being developed to make adjustments to the field. This presentation will discuss quantitatively the magnetic homogeneity requirements, and demonstrate the ability of the shim coil design to meet them.

Primary author: Prof. MARTIN, Jeffery (The University of Winnipeg)

Presenter: Prof. MARTIN, Jeffery (The University of Winnipeg)

Session Classification: M3-7 Fundamental Symmetries and New Physics at Low Energy I (DNP) | Symétries fondamentales et nouvelle physique à basse énergie (DPN)

Track Classification: Technical Sessions / Sessions techniques: Nuclear Physics / Physique nucléaire (DNP-DPN)