

# Studying Systematic Uncertainties of the TUCAN EDM Experiment

*Saturday, 17 February 2024 11:00 (15 minutes)*

The TRIUMF Ultra Cold Advanced Neutron (TUCAN) Collaboration is developing an apparatus to measure the neutron electric dipole moment (nEDM) to a sensitivity of  $10^{-27}$  ecm, an order of magnitude improvement over the current best limit. The measurement will be conducted over around 105 experiment cycles using spin-polarized ultracold neutrons produced by the high-intensity TUCAN source in a well-characterized magnetically-quiet environment. Characterizing remnant magnetic-field related systematic effects is vital to improving the nEDM limit.

An nEDM measurement relies upon precise magnetic field data collected during an experiment cycle. The mechanisms that produce bias in an nEDM measurement can be simulated computationally to relate cycle-by-cycle magnetic field measurements with an overall systematic nEDM uncertainty. This presentation will focus on the details of how a simulation is constructed to model an nEDM measurement and how the simulation can be used to understand the propagation of magnetic field measurement uncertainties to systematic uncertainty in the TUCAN EDM measurement.

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