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(G) (POS-19) Characterization of diamond-like carbon coatings for ultracold neutron transport

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The neutron electric dipole moment (EDM) is being extensively studied worldwide with the goal of improving its precision. At TRIUMF, the EDM precision goal is 10^{-27} e-cm, which is an order of magnitude more precise than the previous best measurement. The experiment will use a new high-intensity ultracold neutron (UCN) source and a newly developed neutron EDM spectrometer. UCN will be delivered to the EDM spectrometer through coated neutron guide tubes. The tubes will be coated with diamond-like carbon (DLC), which provides a high neutron optical potential (~ 250 neV) which reflects neutrons from its surface, with a minimal loss probability per bounce, such that the loss of UCN from the source to the EDM spectrometer is minimal. These factors are crucial to making the statistical precision of the EDM experiment possible. This poster will present the UCN guide coating facility at The University of Winnipeg, and the approach of pulsed-laser deposition of DLC. Surface analysis of our recent first coatings performed in Winnipeg will also be presented.

Keyword-1

Neutron electric dipole moment

Keyword-2

Ultracold neutron (UCN)

Keyword-3

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