

Contribution ID: 64 Type: Oral Competition (Undergraduate Student) / Compétition orale (Étudiant(e) du 1er cycle)

Simulations to Determine the Material Properties of Diamond-like-carbon Coated UCN Guides

Tuesday 10 June 2025 16:45 (15 minutes)

The TRIUMF Ultracold Advanced Neutron (TUCAN) Collaboration has recently built a surface coating facility at the University of Winnipeg. The primary purpose of this facility is to prepare ultracold neutron (UCN) guides to transport UCNs from source to an electric dipole moment experiment. The application of special coatings enhances UCN reflection and increases transmission through the guide system. The UCN guide coating facility specializes in coating diamond-like-carbon (DLC) onto the inside of cylindrical UCN guide tubes. Before implementing guides in the experiment at TRIUMF, each one must be individually tested to determine if there are any deficiencies in the coatings. In this talk, I will present results of PENTrack simulations of a neutron storage experiment at the Japan Proton Accelerator Research Complex (JPARC) UCN source to characterize the DLC-coated UCN guides. Comparing the experimentally determined and the simulated storage lifetimes of the JPARC experiment allows one to extract the material properties of a given UCN guide. Using this process, any UCN guide coated by TUCAN, or any other group can be evaluated for its efficiency in transporting neutrons.

Keyword-1

DLC

Keyword-2

Ultracold neutrons

Keyword-3

PENTrack

Author: HEPWORTH, Thomas (The University of Winnipeg)

Presenter: HEPWORTH, Thomas (The University of Winnipeg)

Session Classification: (DNP) T3-6 Nuclear reactions | Réactions nucléaires (DPN)

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