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Challenges and opportunities in UCN science: new sources and novel detectors

Thursday, 8 December 2022 13:05 (35 minutes)

In-situ experiments with ultracold neutrons (UCN) present an opportunity to profit from long observation times and high densities, but must confront numerous practical challenges. I will discuss the challenges and opportunities connected with *in-situ* measurements of the neutron's electric dipole moment, focusing on a modular multichamber concept based on UCN production, storage, and detection in small cells filled with isotopically pure superfluid helium. Key challenges include *in-situ* UCN detection with spin selectivity, and the management of systematic errors arising from nondynamical phase shifts. I will discuss possibilities for UCN detection and readout, as well as concepts for implementing them in demonstration- and full-scale experiments. Requirements for magnetic shielding and magnetometry will also be surveyed.

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