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The Current Status of the TUCAN Ultracold Neutron Source

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The TUCAN (TRIUMF Ultra-Cold Advanced Neutron) Collaboration aims to build a new, intense source of ultracold neutrons (UCN). The first experimental use of the TUCAN source will be to complete a world-leading measurement of the neutron electric dipole moment (nEDM), the discovery of which would support the search for new sources of CP violation beyond the Standard Model. Neutrons will be produced via spallation using the TRIUMF cyclotron, and then moderated through a series of materials before being downscattered in superfluid helium (He-II) in the production vessel. The UCN are then transported along the guide, ultimately escaping, at room temperature, to the nEDM experiment. The He-II in the production vessel and UCN guide are maintained at ~ 1 K by a He-II cryostat, which supplies cooling through the evaporation of ^3He . Cooling required by the liquid deuterium (LD_2) moderator will be supplied by an LD_2 cryostat, consisting of a single-phase thermosyphon refrigerated by a He cryocooler. The He-II cryostat was developed and tested in Japan, and is now undergoing assembly and further testing at TRIUMF. The LD_2 moderator loop and UCN production volume are the responsibility of the Canadian collaborators, and are under development. In this presentation, the current status of the TUCAN source will be discussed, as well as plans for the immediate future.

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Please select: Experiment or Theory

Experiment

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