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Recent progress of the TRIUMF Ultra Cold Advanced Neutron Source and EDM Experiment

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Recent progress of the TRIUMF Ultra Cold Advanced Neutron Source and EDM Experiment The TUCAN collaboration is commissioning a world-leading ultracold neutron (UCN) source at TRIUMF, capable of production rates up to 1.6×10^{7} UCN/s once completed. Spallation neutrons are cooled in room temperature heavy water and 20K liquid deuterium, followed by UCN production in a spherical volume of superfluid helium at 1K. UCN are extracted from the production volume to experiments using coated vacuum guides. The flagship experiment for this UCN source is a measurement of the neutron electric dipole moment (nEDM); a second experimental port will be made available for other proposals including neutron lifetime. UCN trapped in a storage cell will be used to measure the neutron EDM using Ramsey's method of separated oscillatory fields. Once the UCN source is complete, we anticipate to reach a statistical sensitivity of 10^−27 e·cm within 400 days of data taking. This presentation will cover UCN source commissioning and nEDM experiment progress at TRIUMF, including initial UCN production results from operating the superfluid He-II source prior to installation of the LD2 moderator.

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