



Contribution ID: 26

Type: **Oral presentation**

Progress towards the TRIUMF ultracold neutron facility and neutron electric dipole moment experiment

Monday 29 August 2022 14:50 (30 minutes)

The TUCAN collaboration is building a next generation ultracold neutron (UCN) source, based on spallation neutron production using protons from TRIUMF's 500 MeV cyclotron. A large cold neutron flux is created via moderator shells of room-temperature heavy water and 20-K liquid deuterium surrounding a near-spherical volume of superfluid liquid helium-4. At around 1 K, the ultracold neutrons created in the superfluid have a long enough lifetime to be extracted to experiments using vacuum neutron guides.

The UCN will be used to search for the electric dipole moment (EDM) of the neutron using Ramsey's technique of separated oscillatory fields. The TUCAN EDM experiment will be operating at room temperature and using a double cell arrangement. A state-of-the-art magnetically shielded room will keep the main systematic effects caused by field inhomogeneity and instability low. Due to this and the large UCN yield expected from our source, we anticipate to reach a statistical sensitivity of $1\text{e-}27$ ecm (1-sigma) within 400 days of beam time.

The presentation will cover the physics principles of source and experiment, and give an update on the design, status and plans.

Scientific topic

Future Facilities

Author: Dr PICKER, Rüdiger (TRIUMF)

Presenter: Dr PICKER, Rüdiger (TRIUMF)

Session Classification: Symmetries