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Neutron electric dipole moment measurement: systematics and magnetic field control

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The search for a permanent electric dipole moment (EDM) of the free neutron is a high precision measurement. Its outcome has high impact on subatomic physics since it's linked to violation of CP symmetry, and to the Baryon Asymmetry of the Universe.
The TUCAN collaboration (TRIUMF UltraCold Advanced Neutron source) aims to build a world leading facility for the production of Ultracold Neutrons (UCN), which are particularly suited for the neutron EDM search. Furthermore, the collaboration aims at achieving an unprecedented measurement sensitivity of 10^-27 ecm – about 30 times better than the current upper limit of 3 x 10^-26 on the neutron EDM.
The difficulty of this measurement lies mostly in having sufficient control over systematic uncertainties and the best available magnetic field stability and homogeneity at the UCN measurement cell. This talk will give an introduction to standard neutron EDM measurement techniques and systematics, as well as focus on the research and development efforts of the TUCAN collaboration with respect to magnetic field control. The current developments at TRIUMF will be highlighted.

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