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The new ultracold neutron facility at TRIUMF

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A permanent non-zero electric dipole moment of the free neutron (nEDM) violates CP-symmetry. Beyond Standard Model theories predict nEDMs very close to the current upper limit of $3{\cdot}10^{-26}$ $e{\cdot}$cm. Those predictions result from CP-violating processes, which in turn can be related to the matter-antimatter asymmetry observed in our universe. Thus the search for an nEDM contributes to understanding the Baryon asymmetry. It also has a high discovery potential for Beyond Standard Model physics. The tool of choice to investigate the nEDM are ultracold neutrons (UCN), since they have such low energies that they can be stored in traps and allow observation times of hundreds of seconds.

The distinct feature of TRIUMFs UCN facility is the combination of a neutron spallation source with a superfluid helium UCN converter - unique among all existing and planned UCN sources worldwide. The goal of the UCN project at TRIUMF is to provide a density of several hundreds of UCN per cubic cm to experiments at up to two ports: one of them will be dedicated to determine the nEDM to the 10^{-27} $e{\cdot}$cm level of precision.

This presentation shall give an introduction to UCN physics, and update the audience on the current status of the new UCN facility at TRIUMF: the proton beamline and spallation target dedicated to UCN production have been commissioned successfully. Furthermore, we created a significant flux of thermal and cold neutrons - a crucial step towards the production of ultracold neutrons. First results of the commissioning process will be presented.

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