

Neutron Electric Dipole Moment Experiment at the Paul Scherrer Institute.

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The quest for the neutron electric dipole moment (nEDM) started more than fifty years ago and is still one of the most important tasks faced by experimental physicists. The reason is that a non zero value of this observable would break both parity (P) and time reversal (T) symmetries. Such symmetry violation is predicted by the Standard Model (SM) as well as by the various Standard Model extensions, however the nEDM value predicted by the SM is several orders of magnitude smaller than those predicted by the extensions. Therefore, the nEDM value can be used to test the extensions. The choice of a neutron is not accidental, since it is possible to investigate free neutrons, where the nEDM observable is not interfered by interactions with other objects in an atom or nucleus. The most precise limit of the nEDM value was given by the RAL/Sussex/ILL collaboration (Phys. Rev. Lett. 97 (2007) 131801). The nEDM collaboration is continuing this experiment using a new source of ultra-cold neutrons at PSI and the extensively rebuilt RAL/Sussex/ILL apparatus, what should enable us to decrease the existing nEDM limitation by almost one order of magnitude within the next two years. The source has already started operating and the first nEDM measurements have been performed. The actual status of the experiment and future plans concerning development of the experiment aiming at the next order of magnitude in accuracy will be presented.

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