

Search for the neutron Electric Dipole Moment at the Paul Scherrer Institute

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The quest for the neutron electric dipole moment (neutron EDM) started more than sixty 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 and time reversal symmetries. Such a symmetry violation can help us to explain why the Universe is essentially made of matter and not of antimatter. A non-zero value of neutron EDM is predicted by the Standard Model (SM) as well as by the various Standard Model extensions; however the value predicted by the SM is several orders of magnitude smaller. Therefore, measurements of the neutron EDM value test the SM extensions.

The newest result of an experiment to measure the neutron EDM will be presented. The experiment was performed at the Paul Scherrer Institute using Ramsey's method of separated oscillating magnetic fields with ultracold neutrons. The statistical analysis was performed on blinded datasets by two separate groups while the estimation of systematic effects profited from an unprecedented knowledge of the magnetic field. As a result, the highest sensitivity among all neutron EDM measurements made to date has been achieved. The further development of the experiment will also be briefly outlined.

Collaboration

nEDM collaboration

Primary author: ZEZMA, Jacek (Jagiellonian University)

Presenter: ZEZMA, Jacek (Jagiellonian University)

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