

Ready to address the permanent electric dipole on the electron

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The observation of a CP-violating permanent electric dipole moment of the electron (eEDM) larger than the value predicted by the Standard Model (SM) of particle physics would be direct evidence of new physics, while an upper limit of the eEDM would constrain extensions to the SM. The NL-eEDM experiment has been set up over the last few years, and first measurements demonstrate the working of all its crucial components. It employs the ground state of the barium monofluoride (BaF) molecule [1] which strongly enhances the CP-violating dipole moment. We create and readout a superposition using coherent state transfers, during which the magnetic and electric fields are precisely controlled and measured to reduce the systematic limit that can be achieved. The setup is now ready for a first measurement.

This talk discusses the experimental setup and its performance for a first collection of data. Furthermore, progress on planned upgrades on molecular beam intensity, deceleration and laser cooling will be presented.

[1] The NL-eEDM collaboration, Aggarwal, P., Bethlem, H.L. et al. Eur. Phys. J.D (2018) 72: 197. <https://doi.org/10.1140/epjd/e2018-90192-9> and references therein.

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