Contribution ID: **4** Type: **Oral**

Beam EDM –a new pulsed-beam experiment to search for the neutron electric dipole moment

Wednesday, 24 September 2025 11:00 (30 minutes)

The neutron represents a versatile tool in the realm of fundamental particle physics. It is used to perform precision physics measurements at low energies with the goal to search for signals beyond the Standard Model of particle physics. In this respect, the neutron Electric Dipole Moment (EDM) has attracted interest as a promising channel for finding new physics since decades. The existence of a permanent neutron EDM violates the combined symmetries of parity (P) and charge conjugation (C) invoking the CPT symmetry.
A new source of CP violation could help to explain the apparent baryon asymmetry in our Universe.
The Beam EDM experiment aims to measure the neutron EDM using a novel concept. The experiment exploits a time-of-flight Ramsey technique with a pulsed beam which allows to distinguish between time-dependent and time-independent effects –and by this overcoming the previously limiting systematic relativistic vxE-effect. Recently, a proof-of-principle apparatus has been developed to perform detailed systematic investigations for a future full-scale experiment intended for the European Spallation Source in Sweden. In this presentation, the details of the experimental apparatus, future prospects, together with results from a data taking campaign at the Institute Laue-Langevin in France will be presented.

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Session Classification: Scientific Program