Contribution submission to the conference Karlsruhe 2024

Statistical Methods in the Search for Electric Dipole Moments at COSY — •Valentin Tempel for the JEDI-Collaboration — Institute for Nuclear Physics II, FZ Jülich, Germany — III. Physikalisches Institut B, RWTH Aachen University, Germany — GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany

The observed matter-antimatter asymmetry in the Universe, which the Standard Model cannot explain, points to the necessity of additional CP-violating phenomena (Sakarov conditions). Particles with Electric Dipole Moments (EDMs) violate both T-symmetry and P-symmetry, implicating CP-violation as well, provided the CPT theorem holds true.

Charged particle EDMs can be measured in storage rings by observing the spin precession of a polarized particle beam. The Cooler Synchrotron (COSY) at Forschungszentrum Jülich provides polarized protons and deuterons up to a momentum of 3.7 GeV/c and offers the possibility to manipulate and measure the beam polarization. The JEDI-Collaboration (Jülich Electric Dipole moment Investigations) is working on the first measurement of the deuteron EDM by observing its influence on spin motion. This presentation will delve into the details of the statistical analysis and fitting methods used to obtain observables, such as the amplitude of the polarization, its corresponding confidence intervals and the spin coherence time.

Part: T
Type: Vortrag;Talk
Topic: 2.10 CP-Verletzung und Mischungswinkel (Exp.); 2.10 CP Violation and Mixing Angle (Exp.)s
Keywords: Electric Dipole Moment; CP Violation; Storage Ring; Statistical Methods; Polarization
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