

## Contribution submission to the conference Gießen 2024

**Towards axion searches with polarized hadron beams and targets at the GSI/FAIR storage rings** — •DAONING GU — Institut für Kernphysik, FZ Jülich, Germany — III. Physikalisches Institut B, RWTH Aachen University, Germany — GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany

Polarized hadron beams can be used to explore interactions that are not observable with unpolarized beams. In particular, polarized beams are more advantageous for testing symmetry violations. They also offer the opportunity to search for new physics beyond the Standard Model (SM).

Axions are leading particle candidates for dark matter. They were originally introduced to solve the strong CP problem and have also appeared in various extensions to the SM. The axion/axion-like-particle (ALP) field has an effect on the spin motion of the particles in storage rings, which leads to an oscillating electric dipole moment (oEDM).

In this talk, results obtained at the Cooler Synchrotron COSY and possible future experiments that can be performed with existing accelerators at GSI/FAIR in Darmstadt with polarized hadron beams and targets will be discussed. The working principle of axion searches in storage rings will be explained and the preliminary results of simulations will be shown.

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