MATTER AND TECHNOLOGIES

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Towards axion searches with polarized hadron beams at GSI/FAIR

Monday 3 November 2025 18:30 (3 minutes)

Polarized hadron beams provide a powerful tool for exploring interactions that are unobservable with unpolarized beams, particular for testing symmetry violations. Axions, originally introduced to solve the strong CP problem, are leading dark matter candidates appearing in various Standard Model extensions. At low masses, axion-like particle (ALP) dark matter behaves as a classical field, potentially detectable when its frequency resonates with a beam's spin-precession frequency.

The JEDI collaboration's proof-of-principle experiment at COSY set upper limits on oscillating EDMs caused by ALPs, though no signals were observed. This poster discusses COSY results and recent efforts to explore the feasibility of conducting axion search experiments using existing accelerators at GSI/FAIR with polarized hadron beams. Additionally, the latest simulation results will be presented, with a focus on the accelerator lattice optimization of the Spin Coherence Time.

Speed talk:

I am unwilling/unable to present a speed talk

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