

Spin-Tracking simulations in a COSY model using Bmad

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The matter-antimatter asymmetry might be understood by investigating the EDM (Electric Dipole Moment) of elementary charged particles. A permanent EDM of a subatomic particle violates time reversal and parity symmetry at the same time and would be, with the currently achievable experimental accuracy, an indication for further CP violation than established in the Standard Model.

The JEDI-Collaboration (Jülich Electric Dipole moment Investigations) in Jülich has performed a direct EDM measurement for deuterons with the so called precursor experiments at the storage ring COSY (COoler SYnchrotron).

In order to understand the measured data and to disentangle an EDM signal from systematic effects, spin tracking simulations in an accurate simulation model of COSY are needed. Therefore a model of COSY was implemented using the software library Bmad. Systematic effects were considered by including element misalignments, effective dipole shortening, longitudinal fields and steerer kicks. These effects rotate the invariant spin axis additional to the EDM and have to be analyzed and understood. The most recent spin tracking results as well as the methods to find the invariant spin axis will be presented.

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