

ID: 2542 Beam Simulation of a Prototype Proton Electric Dipole Moment Storage Ring

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Abstract The matter-antimatter asymmetry may be explained through CP-violation by observing a permanent electric dipole moment (EDM) of subatomic particles. An advanced approach to measure the EDM of charged particles is to apply the unique method of "Frozen Spin" on a polarized beam in a storage ring. To increase the experimental precision step by step and to study systematic effects, the EDM experiment can be performed within three stages: the magnetic ring COSY, a prototype EDM ring and finally all electric EDM ring. The intermediate ring will be a mock-up of the final ring, which will be used to study a variety of systematic effects and the main principles of the final ring. In this contribution, simulations towards the optics of the prototype ring are performed and discussed. The lattice optics with different focusing strengths are generated and studied. Estimations of beam losses in the prototype ring for different lattices are performed by using analytical formulas. These tasks are performed, to minimize systematic errors and enhance beam lifetime in the ring, by optimizing the lattice.

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