Optimization of spin-coherence time in a prototype storage ring for electric dipole moment measurements

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Abstract

The JEDI experiment is dedicated to the search for the electric dipole moment (EDM) of charged particles using storage rings, which can be a very sensitive probe of physics beyond the Standard Model. In order to reach the highest possible sensitivity, a fundamental parameter to be optimized is the particles' Spin Coherence Time (SCT), i.e., the time interval within which the particles of the stored beam maintain a net polarization greater than 1/e. To identify the working conditions that maximize SCT, accurate spin-dynamics simulations with the code BMAD have been performed on the lattice of a "prototype" storage ring which uses a combination of electric and magnetic fields for bending. This talk will present the results of these simulations addressing the impact on the SCT of different factors like horizontal tune, and the electric bending field, as well as suggestions on lattice modifications to further improve its value.