ICAP2015 Abstract

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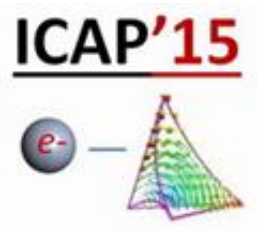

Title **Search for the Optimal Spin Decoherence Effect in a QFS Lattice**

Classification G-2 Spin Dynamics

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Abstract Measurement of electric dipole moment (EDM) in a storage ring requires the spin decoherence in a particle bunch to be less than 1 rad in 1000 s, which corresponds to about 1 billion turns. The quasi-frozen spin (QFS) method* has been proposed for deuteron EDM search. In a QFS lattice, spin direction turn in magnetic bend sections is compensated by spin direction turn in electrostatic bend sections, and thus the spin direction at a point in the lattice is approximately constant. We consider a QFS lattice with an RF cavity and seven families of sextupoles. In COSY Infinity, calculations were done using transfer maps of the 7th order, with symplectic tracking using the Extended Poincaré (EXPO) generating function and the most accurate COSY Infinity fringe field mode. We have optimized the sextupole strengths to minimize the spin decoherence. Using these sextupole strengths, we have done spin tracking of the lattice and analyzed the growth of spin decoherence as a function of the number of turns. Within their scope, our results indicate the feasibility of the QFS method.

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Footnote * Yu. Senichev et al., Quasi-frozen Spin Method for EDM Deuteron Search, in Proc. 6th International Particle Accelerator Conference, Richmond, VA, USA, pp. 213215, 2015.

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