

Contribution submission to the conference Mainz 2022

Optimization of proton spin coherence time with three families of sextupoles at prototype EDM ring — ●ALEKSEI MELNIKOV for the JEDI-Collaboration — Institute for Nuclear Research of the Russian Academy of Sciences, Moscow, Russia

The JEDI collaboration aims to perform a direct measurement of the electric dipole moment (EDM) of protons. For this purpose the prototype storage ring (PTR) is designed. It will allow for feasibility studies of many experimental techniques that are needed to perform an ultimate precision storage ring EDM measurement.

A prototype EDM ring is an intermediate step before building the final storage ring to demonstrate sufficient beam lifetime and SCT (Spin Coherence Time) in a pure electrostatic ring as well as in storage ring with combined electric and magnetic bending elements.

The current lattice of such a ring has fourfold symmetry and operates in a frozen spin mode with weak vertical focusing. Two existing sextupole families are used to increase the spin coherence time. In the current design the maximum value of proton SCT is about 100 s. The proposed way to increase SCT is to insert the third family of sextupoles to adjust chromaticities and second order momentum compaction factor to any desired value. All three families should be located at points with different ratios of optical functions and dispersion. A racetrack option of the prototype ring with strong focusing is proposed to fulfill this requirement. The adjustment of the third sextupole family helped to increase proton SCT up to 1000 s.

Part: AKBP
Type: Vortrag;Talk
Topic: Hadron Accelerators and Colliders
Email: alexei.a.melnikov@gmail.com