

The Quasi-Frozen Spin concept of the deuteron storage ring as an instrument to search for the electric dipole moment

Y. Senichev, IKP, Forschungszentrum Jülich, Germany
on behalf of the JEDI Collaboration

One of the possible arguments for the breaking of CP invariance is the existence of non-vanishing electric dipole moments (EDM) of elementary particles. Currently, the “Jülich Electric Dipole Moment Investigation” (JEDI) collaboration works under the conceptual design of the ring specifically for search of the deuteron electrical dipole moment (dEDM). The proposed Quasi-Frozen Spin concept differs from the Frozen Spin concept in that the spin of the reference particle is alternately deflected by a few degrees in different directions relative to momentum in the electric and magnetic parts of the ring. The QFS concept will allow using the existing COSY ring as pilot facility. The paper presents conceptual approach to ring design based on results of a study of spin decoherence and systematic errors, as well as the sensitivity estimation of the method to the determination of EDM.