Contribution submission to the conference Dresden 2017

An Active Spin Tune Feedback System for the Cooler Synchrotron (COSY) — •Nils Hempelmann — Institut für Kernphysik, Forschungszentrum Jülich

The Jülich Electric Dipole Moment Investigation (JEDI) Collaboration works on a measurement of the electric dipole moment (EDM) of charged hadrons using a storage ring. Such a dipole moment would violate CP symmetry, providing a test for physics beyond the Standard Model. To measure the EDM in a magnetic storage ring, the precession of the spin in the ring has to be kept in phase with an RF Wien Filter that manipulates the spin.

In fall 2015 an active feedback system that meets this requirement was successfully tested at COSY. The system works by adjusting the accelerator frequency, which changes the beam velocity and therefore the rate of spin precession. Data from the polarimeter EDDA are analyzed over a period of about one second to determine the relative phase between the spin precession and the external frequency, which is used to calculate the necessary correction.

In absence of a Wien filter an RF solenoid coil was used as a spin manipluator in the tests.

The test of the feedback system proofs that the method is suitable for a proof of principle experiment for EDM measurements at COSY.

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