

# STABILIZATION OF THE DEUTERON SPIN TUNE IN A STORAGE RING USING ACTIVE FEEDBACK

**Nils Hempelmann<sup>1,2</sup> on behalf of the JEDI collaboration**

<sup>1</sup>*Institut für Kernphysik, Forschungszentrum Jülich, 52425 Jülich, Germany*

<sup>2</sup>*III. Physikalisches Institut B, RWTH Aachen University, 52056 Aachen, Germany*  
*n.hempelmann@fz-juelich.de*

Permanent electric dipole moments (EDM) in elementary particles would violate CP-symmetry. The JEDI (Jülich Electric Dipole moment Investigations) collaboration will measure the EDM of charged hadrons using a storage ring. To keep the spin oscillation in phase with an external frequency, which is a requirement for EDM measurements in magnetic storage rings, an active feedback system was developed and tested with a polarized deuteron beam at the Cooler Synchrotron (COSY).

The feedback system determines the spin polarization using information from the polarimeter EDDA. Data measured over a time of about one second are analyzed to determine the necessary correction. The phase of the spin rotation is continuously adjusted by modifying the accelerator frequency, which changes the beam velocity and hence the rate of spin precession.

The effects of the EDM in a storage ring were mimicked using an rf-solenoid whose frequency was locked with respect to the spin oscillation. Like an EDM, the solenoid gradually tilts the spin from a horizontal to a vertical direction.

The results of the tests of the feedback system demonstrate that the method is suitable for a future proof of principle experiment for EDM measurements at COSY.