

# Commissioning of the RF Wien filter for a first deuteron EDM measurement at COSY/Jülich\*

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## Abstract

The JEDI Collaboration<sup>1</sup> aims for a measurement of the electric dipole moments (EDMs) of deuterons and protons at the COoler SYnchrotron (COSY). To make this possible, a novel high precision waveguide RF Wien filter [1, 2, 3] was installed in COSY inside a so-called low-beta section, to modulate the spin of deuterons and protons. With this device the force of the radial electric field is canceled by the corresponding vertical magnetic force. So it is possible to directly manipulate the polarization vector of the particles without introducing any beam oscillations. The RF Wien filter has been designed to operate at harmonics of the spin precession frequency ranging from 0.6 to 1.7 MHz. For systematic investigations of sources of false EDM signals, the waveguide RF Wien filter can be rotated by 90° around the beam axis. The results of several weeks of commissioning experiments at COSY with the RF Wien filter, including Lorentz force measurements, driven oscillations and the resonant build-up of vertical polarization will be presented. A series of test measurements similar to the the upcoming first deuteron EDM measurement were performed as well.

## References

- [1] **J. Slim** et al., Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment **828**, 116 (2016).
- [2] **J. Slim** et al., Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment **859**, 52 (2017).
- [3] **J. Slim**, F. Rathmann, and D. Heberling, Phys. Rev. E **96**, 063301 (2017).

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<sup>†</sup><http://collaborations.fz-juelich.de/ikp/jedi>

<sup>1</sup>Jülich Electric Dipole Investigations