

Signal-to-Noise Ratio of Rogowski Beam Position Monitor

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The first direct measurement of charged particle **Electric Dipole Moment** (EDM) was performed by the **Jülich Electrical Dipole Moment Investigations** (JEDI) collaboration. These investigations were carried out using polarized deuteron beams at the **COoler SYnchrotron** (COSY) located at the Forschungszentrum Jülich in Germany. The search for an EDM demands high precision measurements, separating the true EDM signal from the background. As a next step a prototype electrostatic EDM ring will be designed to increase the sensitivity of the measurement. Here the necessity of a near ideal beam closed orbit requires a system of many compact and highly sensitive **Beam Position Monitors** (BPM).

A new type of BPM has been developed based on a segmented toroidal Rogowski coil. These Rogowski BPMs are highly compact requiring only about 10 centimeters of free space for installation while providing a resolution of a few micrometers. The Rogowski BPMs compete with other BPM types in order to provide the best resolution and SNR, while using as little space as possible.

In this talk, new results from the investigation into the signal to noise ratio of the Rogowski BPM will be presented, including new methods to improve the signal to noise ratio by reducing the intrinsic noise of the different components of the setup.