

Development of a Rogowski Coil as a horizontal and vertical Beam Position Monitor

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Abstract

Electric Dipole Moments (EDMs) violate parity and time reversal symmetries. Assuming the CPT-theorem, this leads to CP violation, which is needed to explain the matter over antimatter dominance in the Universe. So far no direct EDM measurements for charged hadrons have been performed. The goal of the JEDI collaboration (Jülich Electric Dipole moment Investigations) is to measure the EDM of charged particles (p , d and ${}^3\text{He}$). The measurement of EDMs of charged particles can be performed in storage rings by observing a polarization build-up proportional to the EDM. Due to the smallness of the effect many systematic effects leading to a fake build-up have to be studied. A first step on the way for an EDM measurement is the investigation of systematic errors at the storage ring COSY (COoler SYnchrotron). One part of these studies is the control of the beam orbit with high precession. Therefore a concept of new Beam Position Monitors (BPMs) based on magnetic pick-up coils are used. The main advantage of the coil design compared to electric pick-up BPMs is the high response to bunched beam frequency signal and the compactness of the coil itself. One Rogowski BPM measures the beam position in horizontal and vertical direction. First measurement results of such a horizontal and vertical BMP in laboratory and accelerator environment will be presented.