

Development of compact highly sensitive beam position monitors for storage rings

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Abstract

The history of the search for electric dipole moment (EDM) takes us back in time for more than five decades. EDMs have gained interest due to the fact that they violate the CP symmetry. Hence potentially provide additional sources of CP violation and possibly contribute to the resolution of one of the greatest puzzles of cosmology; namely to explain the matter abundance in the universe.

The JEDI collaboration is currently preparing for measuring the Deuteron EDM in the COoler SYnchrotron (COSY). One of the major challenges that one needs to worry about is the precise knowledge about the beam position along the ring. Transverse beam positions largely control the systematic errors. Thus the development of compact and highly sensitive Beam Position Monitors (BPMs) is particularly important for precision experiment like the EDM searches.

This poster describes the development process of the latest set of Rogowski coils as compact beam position monitors. It also describes some of the future plans towards optimizing the sensitivity of these coils by cooling (down to 10 K) to reduce the thermal noise. These BPMs were installed in COSY at the entrance and exit of the waveguide RF-Wien filter. Another two sets of coils will be used at the entrance and exit of the static precision solenoid that will be prepared for installation by the end of 2018/beginning of 2019 as a novel spin manipulator.