

Beam based alignment at the Cooler Synchrotron (COSY)

Tim Wagner^{1,2} for the JEDI collaboration

¹Institut für Kernphysik, Forschungszentrum Jülich, Germany
²III. Physikalisches Institut B, RWTH Aachen University, Germany

t.wagner@fz-juelich.de

The JEDI collaboration intends to perform a direct measurement of the electric dipole moment (EDM) of protons and deuterons using a storage ring. In order to measure the EDM with a high precision a small orbit RMS is needed, since unknown magnetic fields, which are picked up when one is off of the optimal orbit, significantly add to the systematic error.

In order to achieve a good orbit RMS in the accelerator one needs to know the size of the offsets between the beam position monitors (BPM) and the magnets, i.e. quadrupoles. A beam time to determine those offsets for the first time for all quadrupoles in the Cooler Synchrotron (COSY) has been performed in September/October 2019. During the beam time the so called beam-based alignment method was used to determine the location of the magnetic center for all the quadrupoles with respect to the electric center of the BPMs. With the known offsets between the BPMs and quadrupoles one can recalibrate the BPMs to have the zero orbit go through the magnetic centers of the quadrupoles.

In this talk the results of that beam time and other insight gained into the positions of the quadrupoles will be presented.