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Development of a combined element with an electric and magnetic fields for the JEDI experiment

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Precision measurements of the permanent electric dipole moment (EDM) of fundamental particles require the development of new methods and techniques. The precursor experiments to measure the proton and deuteron EDM at the Cooler Synchrotron COSY in Jülich led to the development of a ring concept with combined magnetic and electric field elements. The building of high-stability electric and magnetic field deflectors is one of the technical challenges of this project.

The previous studies on small-size deflectors have shown promising results in achieving high electric field strengths. For the present tests, a large-gap dipole magnet with a suitable vacuum chamber is equipped with a real-size prototype 1 m long deflector plates. Using high-voltage (200 kV) precision power converters we are aiming to achieve the design values of the prototype electrostatic ring of the order of 7 MV/m with 60 mm spacing between the electrodes in a presence of a necessary magnetic field.

The setup for studying the electric and magnetic field strength at various distances, as well as the results of the measurements, will be presented.

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Footnotes

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