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PRESTO - A PROtotype STOrage ring for the precision frontier

Two of the major scientific drivers of particle physics and cosmology are the search for antimatter after the Big Bang and the origin of Dark Matter. The answers to these questions can be addressed by investigating permanent and oscillating Electric Dipole Moments (EDM) of fundamental particles. The experiments can be performed with polarized beams in a dedicated storage ring.

Important milestones have been achieved by the JEDI Collaboration, using the magnetic storage ring COSY at Forschungszentrum Juelich (Germany). The next measure is to design a Prototype Storage Ring, comprising two steps: (i) an all-electric version and (ii) a hybrid ring, complementing the electric fields with magnetic ones. The layout of the ring with a beam energy of about 30-45 MeV and a circumference of around 100 m will serve as enabler for the final EDM facility operated at a magic energy of 233 MeV, with a circumference of about 500 m.

Once built, the first phase will demonstrate the remaining ambiguities and technologies, and in the second stage provide a first direct measurement of the EDM of the proton with a sensitivity comparable to EDM measurements of neutrons.

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