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EDM measurement in a proton storage ring

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A measurement of the proton EDM to better than 10^{-29} ecm, or better, allows us to probe physics in a new regime up to ~ 3 PeV mass scale. The use of the storage ring EDM technique permits 5 orders of magnitude improvement over current indirect measurements of d_p (from Hg) and 3 orders magnitude more sensitivity on χ QCD inferred from neutron EDM measurements. Non-zero values of the pEDM would unambiguously point to the existence of NP. We describe the design of an electric- only ring that combines the frozen spin technique with counter-rotating proton beams that can deliver these physics objectives. The experimental and technological challenges have been addressed in detail over the last 5 years; developments in magnetic field shielding now make this a low risk and relatively low cost experiment. We present a summary of the major machine and detector components required to build this experiment.

Primary authors: BOWCOCK, Themis (University of Liverpool (GB)); SEMERTZIDIS, Yannis (CAPP/IBS and KAIST in South Korea)

Presenters: BOWCOCK, Themis (University of Liverpool (GB)); SEMERTZIDIS, Yannis (CAPP/IBS and KAIST in South Korea)

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