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Polarimeter Detector development using GEM technology for Proton EDM Measurement

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Finding nonzero EDM (electric dipole moment) in a fundamental particle would signal strong CP violation and consequently it could explain matter and antimatter asymmetry in our universe. The storage ring proton Electric Dipole Moment (pEDM) experiment is one of the EDM searches using storage ring aiming sensitivity level of 10^{-29} e·cm per year. In the experiment, the stored polarized protons are slowly extracted and scattered on a carbon target. Through the interactions between the polarized protons and unpolarized carbon nuclei, one can measure the integrated spin precession angles which is caused by the constant electric field in the storage ring. GEM detectors are considered as the polarimeter detectors for asymmetry measurement of the elastically scattered proton signals. In this study, we report MC simulation results of proton scattering on carbon target. The design concept of the GEM-based polarimeter detector is also discussed.

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