

# Asymmetry realization of p-Carbon interactions in Geant4 for the storage ring proton EDM experiment

*Friday, July 6, 2018 8:15 PM (15 minutes)*

Our universe appears to break the CP symmetry in the strong interaction within the paradigm of the elementary particle physics. However, no violation has been discovered so far by experiments. To address this question further, a storage ring experiment has been proposed to search for a permanent intrinsic electric dipole moment of proton (pEDM) with the target sensitivity of  $10^{-29}$  e.cm within a year of measurement time. A polarimeter for the proposed storage ring proton EDM (SR pEDM) experiment is being under development using gas electron multiplier (GEM) technology. For an efficient polarimeter design study, we wrote a computer simulation code in the Geant4 frame, which makes the spin-dependent proton-carbon elastic hadronic scattering possible. The cross section of the scattering was implemented with reference from experimental data. The new algorithm of Geant4, its operation, and more details are introduced in this report. Furthermore, the performance of the GEM detector has been demonstrated at Forschungszentrum Juelich (FZJ) in Germany using Deuteron beam generated by Cooler Synchrotron (COSY). (This work was supported by IBS-R017-D1-2018-a00.)

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**Session Classification:** POSTER