

Calculation of Nucleon Electric Dipole Moments Induced by Quark Chromo-Electric Dipole Moments and the QCD θ -term

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Electric dipole moments (EDMs) of nucleons and nuclei, which are sought as evidence of CP violation, require lattice calculations to connect constraints from experiments to limits on the strong CP violation within QCD or CP violation introduced by new physics from beyond the standard model. Nucleon EDM calculations on a lattice are notoriously hard due to large statistical noise, chiral symmetry violating effects, and potential mixing of the EDM and the anomalous magnetic moment of the nucleon. In this report, details of ongoing lattice calculations of proton and neutron EDMs induced by the QCD θ -term and the quark chromo-EDM, the lowest-dimension effective CP-violating quark-gluon interaction are presented. Our calculation employs chiral-symmetric fermion discretization. An assessment of feasibility of nucleon EDM calculations at the physical point is discussed.

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Note:

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