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EDMs: Theory Overview

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Electric dipole moments (EDMs) are extremely sensitive probes of physics beyond the Standard Model (SM). A vibrant experimental program is in place, with the goal of improving existing bounds on the electron and neutron EDMs by one/two orders of magnitude, while testing new ideas for the measurement of EDMs of light ions, such as the proton and the deuteron, at a comparable level. The success of this program, and its implications for physics beyond the SM, relies on the precise calculation of the EDMs in terms of the couplings of CP-violating operators, induced by BSM physics in the QCD Lagrangian. In light of the non-perturbative nature of both QCD at low energy and of the nuclear interactions, these calculations have proven difficult, and are affected by large theoretical uncertainties. In this talk I will review the progress that has been achieved on different aspects of the calculation of hadronic and nuclear EDMs, the challenges that remain to be faced, and the implications for our understanding of physics beyond the SM.

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