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Fundamental Symmetries Using Nucleons and Nuclei

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Low-energy tests of fundamental symmetries are extremely sensitive probes of physics beyond the Standard Model, reaching scales that are comparable, if not higher, than directly accessible at the energy frontier. The interpretation of low-energy precision experiments and their connection with models of physics beyond the Standard Model (BSM) relies on controlling the theoretical uncertainties induced by the nonperturbative nature of QCD at low energy and of the nuclear interactions. In this talk, I will focus on two of the most sensitive probes of fundamental symmetries, neutrinoless double beta decay and searches for electric dipole moments (EDMs). After reviewing the physics reach of these experiments, I will discuss recent progress in the theoretical predictions of neutrinoless double beta decay nuclear matrix elements and nucleon and nuclear EDMs. I will then discuss how the interplay of Lattice QCD and nuclear Effective Field Theories is crucial to achieve fully ab initio predictions, with reliable theoretical uncertainties.