

Probe hyperon electric dipole moments at electron-positron colliders

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The electric dipole moment (EDM) of elementary particles, serves as a powerful probe for new physics beyond the Standard Model (SM) and holds the potential to provide novel insights in unraveling the enigma of the matter-dominated universe. Hyperon EDM is a largely unexplored territory. In our recent paper ([arxiv:2307.04364](#)), we present a novel method that focuses on entangled hyperon-antihyperon pairs in J/ψ decays for the indirect extraction of hyperon EDM. Leveraging the statistics from the BESIII experiment, the estimated sensitivity for Λ EDM can reach an impressive level of 10^{-19} e cm, demonstrating a **three-order-of-magnitude improvement** over the only existing measurement in a fixed-target experiment at Fermilab with similar statistics. The estimated sensitivities for the Σ^+ , Ξ^- , and Ξ^0 hyperons at the same level of 10^{-19} e cm will mark the first-ever achievement and the later two will be the first exploration in hyperons with two strange valence quarks. The EDM measurements for hyperons conducted at the BESIII experiment will be a significant milestone and serve as a litmus test for new physics such as SUSY and left-right symmetrical model. Furthermore, at the STCF experiment, the sensitivity of hyperon EDM measurements can be further enhanced by two orders of magnitude.

Parallel Session

Fundamental Symmetries / New Physics Searches

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