

CP Violation Beyond SM: Dark Photon and Goldstone boson Frameworks

Sunday, 23 November 2025 11:35 (25 minutes)

This talk explores CP violation (CPV) in theories beyond the Standard Model (BSM). It addresses the long-standing puzzle that known CPV sources within the SM are insufficient to explain the observed matter-antimatter asymmetry of the universe, necessitating the identification of new CPV mechanisms. We present a systematic study of CPV mediated by two distinct BSM carriers: the dark photon and the Goldstone boson. The analysis demonstrates how their unique coupling structures generate observable CPV signals. By comparing their implications for electric dipole moments (EDMs), flavor-changing neutral currents (FCNCs), dark matter (DM), electroweak fits, and the resulting baryon asymmetry, we delineate the viable parameter space in light of current experimental constraints. Our findings underscore BSM CPV as an indispensable gateway to new physics at both the energy and precision frontiers.

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