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Paradigm changing studies of spin entangled hyperons and antihyperons at BESIII

Monday, 22 June 2026 11:20 (40 minutes)

This talk presents paradigm-changing studies of spin-entangled hyperons and antihyperons conducted at the BESIII experiment. Utilizing unique, high-statistics datasets of quantum-entangled pairs produced in electron-positron collisions, BESIII has established itself as a leading facility for precision hyperon physics. The core research focuses on the search for Charge-Parity (CP) violation in the decays of various hyperons, achieving unprecedented sensitivities at the level of 10ˆ-3, which is crucial for understanding the matter-antimatter asymmetry of the universe. A landmark achievement is the world's most precise measurement of the Lambda hyperon's electric dipole moment (EDM), improving the experimental upper limit by over two orders of magnitude and providing a new probe for physics beyond the Standard Model. Furthermore, the program encompasses detailed investigations into hyperon radiative decays, semileptonic decays, and spin-polarization dynamics. Collectively, these results leverage BESIII's unique capabilities at the charm energy region to advance fundamental knowledge of QCD, CP symmetry, and the search for new physics in the baryon sector.

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