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Testing fundamental symmetries in hyperon decays with BESIII

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Decays of spin-polarised and quantum-entangled hyperon-antihyperon pairs have recently presented themselves as promising hunting grounds for processes that violate fundamental symmetries, such as charge conjugation (C) and charge conjugation and parity (CP). When hyperons are produced in electron-positron annihilations, the quantum numbers of the initial state are well-known. This enables a full spin decomposition of the multi-step decay process from which we can construct precise symmetry tests. In particular, sequential decays of multi-strange hyperons allow for a separation of strong and weak amplitudes, resulting in a better sensitivity to CP violation.

The world-record sample of 10^{10} J/Psi from the Beijing Spectrometer (BESIII) provides a unique source of almost background-free

hyperon-antihyperon pairs. From this, several stringent symmetry tests in hyperon decays have emerged. In this talk, I will present an overview of BESIII hyperon decay studies, with focus on recent results.

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