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Parity Violation on Quantum Entanglement and Bell Nonlocality

Collider tests of quantum entanglement (QE) and Bell nonlocality (BN) have offered a new opportunity for deepening our understanding on quantum mechanics. While most of the existing work on this topic has been focusing on parity (P) conserving interactions, I will address in this talk how P violation could change the spin correlations of the spin-half bipartite systems, thus modifying the predictions of both QE and BN. In addition, spin interactions with the environment has been largely overlooked in literature, I will also show with promising candidates at BESIII and a lepton collider how this overlooked effect is however essential for a genuine determination of P and CP symmetries.

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