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Three-body entanglement and nonlocality in particle decays

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The investigation and collider measurement of quantum information generated in elementary particle interactions have attracted growing interest in recent years. To date, most studies have focused on bipartite systems, for example, spin correlations in top-quark pair production, while the rich structure of multipartite quantum correlations remains largely unexplored in high-energy physics.
In this talk, based on 2310.01477 and 2502.19470, I will present a novel framework for analysing genuine three-body quantum correlations in 1 \to 3 particle decays. In particular, I will discuss the monogamy of entanglement and demonstrate the presence of two distinct classes of nonlocality in tripartite quantum systems.

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