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Testing the Quantum nature of reality with Higgs bosons

Monday 7 April 2025 16:30 (15 minutes)

The ATLAS Collaboration has recently observed quantum entanglement in top-quark pairs using 13 TeV proton-proton collision data—marking the first observation of entanglement in fundamental quarks and at the highest energy scales ever probed and exposing limitations in state-of-the-art Monte Carlo simulations at the same time. Building on this milestone, this talk will explore new measurements aimed at accessing maximally entangled states in Higgs boson decays. In particular, I will discuss the reconstruction of entangled vector boson states using quantum tomography observables, highlighting the potential of collider experiments to probe quantum information concepts in novel ways.

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