

Quantum entanglement in top quark pair production at a photon collider

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We explore quantum entanglement in top quark pair production at a photon collider realized via laser backscattering at an electron linear collider. By analyzing the $\gamma\gamma \rightarrow t\bar{t}$ process within the density matrix formalism, we quantify spin correlations and entanglement using concurrence and entropy-based measures. The high degree of control over photon polarization in this setup enables precise tests of quantum coherence and sensitivity to possible new physics effects. Our results demonstrate that such photon colliders provide a promising platform for probing fundamental aspects of quantum information in high-energy processes.

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