

3rd International Workshop on Machine Learning and Quantum Computing Applications in Medicine and Physics



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Quantum information theory at colliders

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I will discuss how concepts and tools from quantum information theory, in particular the notion of entanglement, can be applied to elementary particle scattering at high-energy colliders. In this framework, the discrete quantum numbers of scattered particles are identified with quantum-information-theoretic qubits, and the resulting density matrix reflects the structure of the underlying perturbative expansion. I will review some recent findings that connect the entanglement properties of scattered particles to specific features of scattering amplitudes. Finally, I will discuss how minimization of quantum entanglement generated in a scattering event can lead to the emergence of symmetries.

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