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Quantum jet clustering with LHC simulated data

We study the case where quantum computing could improve jet clustering by considering two new quantum algorithms that might speed up classical jet clustering algorithms. The first one is a quantum subroutine to compute a Minkowski-based distance between two data points, while the second one consists of a quantum circuit to track the rough maximum into a list of unsorted data. When one or both algorithms are implemented in classical versions of well-known clustering algorithms (K-means, Affinity Propagation and k_T-jet) we obtain efficiencies comparable to those of their classical counterparts. Furthermore, in the first two algorithms, an exponential speed up in dimensionality and data length can be achieved when applying the distance or the maximum search algorithm. In the k_T algorithm, a quantum version of the same order as FastJet is achieved.

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Short summary of your poster content

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