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Quantum algorithm for the classification of supersymmetric top quark events

The search for supersymmetric particles is one of the major goals of the Large Hadron Collider (LHC). Supersymmetric top searches play a very important role in this respect, but the unprecedented collision rate to be attained at the next high luminosity phase of the LHC poses new challenges for the separation between any new signal and the standard model background. Quantum computing techniques may yield an efficient solution for this problem. In this talk, I will present a novel application of a binary classification based on quantum annealing machine learning to discriminate a stop signal from the background, and its implementation in a quantum annealer machine. This approach together with the pre-processing of the data with principal component analysis may yield better results than conventional multivariate approaches.

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