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328 Identifying the Higgs boson production in the $t\bar{t}H(bb)$ channel using quantum classifiers

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We have developed two quantum classifier models for the $t\bar{t}H(bb)$ classification problem, both of which fall into the category of hybrid quantum-classical algorithms for Noisy Intermediate Scale Quantum devices. Our results serve as a proof of concept that Quantum Machine Learning (QML) methods can have similar or better performance, in cases of low number of training samples, with respect to conventional methods. To utilise algorithms with a low number of qubits we investigated different feature reduction methods. We addressed different configurations of two models, representative of the two main approaches to supervised QML today: a Quantum Support Vector Machine, a kernel-based method, and a Variational Quantum Circuit, a variational approach.

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