Search for new physics in all-hadronic $t\bar{t}t\bar{t}$ using ML

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Abstract

There is current interest in searching for beyond the standard model particles produced in association with a top quark pair, $t\bar{t} + X(X \to t\bar{t})$. This project focuses on a top-philic Z' resonance model that may significantly enhance the $t\bar{t}t\bar{t}$ cross section. The all-hadronic channel is explored in the resolved regime using a novel machine learning algorithm, SPA-Net, which performs permutation-invariant jet-parton assignment to reconstruct events. This talk presents initial limits using this network to discriminate signal against large QCD multijet- and $t\bar{t}$-dominated backgrounds. Studies shown use Monte Carlo simulations of proton-proton collision data gathered by the CMS detector at the LHC.