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Improvement of Jet Substructure Techniques by Studying HH -> WWWW -> Hadrons with the CMS Experiment

Saturday, 1 December 2018 15:35 (15 minutes)

Theories beyond the Standard Model of particle physics predict increased production of two Higgs bosons (HH). Searches for HH production often involve hadronic final states that deal with large backgrounds. Recently, there has been an increase in new jet substructure techniques that utilize machine learning algorithms. These algorithms may be able improve the signal to noise ratio in HH searches. The Boosted Event Shape Tagger (BEST) is a Neural Network that utilizes jet substructure, but has not yet been applied to searches for HH. A particularly interesting HH process that has not yet been explored is HH→WWWW→hadrons. This process has a unique hadronic final state that is being used for creating a new HH specific neural network based off of BEST. The Hadronic diHiggs Event Shape Topology Identification Algorithm (HHESTIA) is being trained with this process for use with collision data from the Compact Muon Solenoid (CMS) experiment at the European Organization for Nuclear Research (CERN). This procedure can serve as a guide for altering BEST to use with searches for HH production and searches for diboson production. This presentation will focus on early work and future plans for HHESTIA.

Session

Works in Progress (15+5 min)

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