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Jet tagging with the Boosted Event Shape Tagger at CMS

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The Boosted Event Shape Tagger (BEST) is a boosted jet tagger that classifies large radius jets as originating from: Higgs, W, Z, top, bottom, or QCD. In BEST, jet constituents are boosted along the jet axis assuming 7 different mass hypotheses. In each frame, a series of Boosted Event Shape variables are calculated. These variables, along with jet kinematic information, are used as inputs to a fully connected, dense neural network. This relatively simple, physics inspired approach is competitive with advanced convolutional networks. This specialized tagger was developed for the CMS search for pair production of top-like vector-like quarks in an all hadronic final state and can be applied to other searches at CMS. In updating the search from 2016 data to full run 2 data, this tagger underwent many iterations. This poster will show the evolution of BEST with a focus on application to the search for pair production of top-like vector-like quarks.

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