

New Potentials in Boosted-Jet Regimes through Inclusive Jet Model Pre-Training

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Advanced boosted-jet taggers, such as those involving $H \rightarrow b\bar{b}/c\bar{c}$ or $t/W/Z$ tagging, have significantly enhanced the sensitivity of many analyses at the LHC. Recently, an inclusive pre-trained large- R jet model has been successfully deployed in the CMS experiment. In this talk, we discuss two novel potentials brought by this technique. Firstly, the novel $X \rightarrow c\bar{b}$ tagging technique can be utilized to measure the $W \rightarrow c\bar{b}$ decay, opening a new avenue for constraining the CKM matrix element V_{cb} at the LHC, with performance surpassing traditional $W \rightarrow c\bar{b}$ measurement methods. Additionally, the latent features of the pre-trained model can serve as new jet variables. When combined with other event-level features, it can facilitate high-performance event-level classifiers, leading to enhanced results in e.g., $H \rightarrow b\bar{b}$ and $HH \rightarrow 4b$ analyses.

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