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Transformer models for heavy flavor jet identification in CMS

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During Run2 of the Large Hadron Collider (LHC), deep-learning-based algorithms were established and led to a significantly improved heavy flavor (b and c) jet tagging performance. In the scope of large-radius boosted jets like top-quark jets, Graph Neural Network (GNN) based models, e.g. ParticleNet, have reached state-of-the-art performance. As a step further, we present Particle Transformer (ParT), a new algorithm that incorporates physics-inspired interactions in an augmented self-attention mechanism. We show that ParT substantially improves the heavy flavor jet tagging performance compared to the state-of-the-art DeepJet algorithm. ParT is therefore a promising algorithm to be used for heavy flavor jet identification during Run3 of LHC.

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