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Machine learning approaches to the identification of jets originating from heavy-flavor quarks.

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The identification of jets originating from heavy-flavor quarks (b-quark, c-quark) is central to the LHC physics program. High-performance heavy-flavor tagging is necessary both in precise standard model measurements as well as in searches for new physics. Jets containing heavy-flavor have a distinct characteristics, but the production rate of such jets is several orders of magnitude smaller than the backgrounds. To identify b- and c-jets with the necessary background rejection, ATLAS uses BDTs, RNNs, and deep learning techniques to combine many low-level discriminating observables reconstructed in LHC collision events. We present the latest heavy-flavor jet tagging algorithms developed by the ATLAS collaboration and discuss their expected performance in simulation as well as their measured performance in collision data.

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