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Topological b-hadron decay reconstruction and application for heavy-flavour jet tagging in ATLAS

The identification of jets originating from the hadronisation of heavy-flavour quarks represents a key ingredient in the physics program of the ATLAS experiment. Exploiting the topological structure of weak b- and c-hadron decays, the multi-vertex finder algorithm - JetFitter - tries to reconstruct the full b-hadron decay chain inside b-jets and provides a complementary approach to conventional secondary vertex finder algorithms. Based on the hypothesis that the primary and displaced b- and c-hadron decay vertices lie on a common line approximating the b-hadron flight direction, an extension of the Kalman Filter formalism for vertex reconstruction implemented in JetFitter allows to solve this pattern recognition problem. Detailed information on the reconstructed decay cascades is then used to identify and discriminate heavy-flavour jets. This poster presents the principle of this algorithm and its performance in the context of a recent optimization campaign performed in view of the 2017 LHC data-taking by the ATLAS detector.

Experimental Collaboration

ATLAS Collaboration

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