Flavour Tagging

The goal of flavour tagging is to correctly identify and discriminate between jets originating from light quarks or gluons (light-jets), c-quarks (c-jets), and b-quarks (b-jets).

Properties of b-hadrons:
- High mass (~5 GeV)
- Relatively long lifetime (~1.5 ps)

b-jet Trigger Configuration and Trigger Menu [5]

In high pile-up environments with many tracks there is high CPU cost and time loss in running track reconstruction. As pile-up increases it becomes imperative to be as judicial and efficient as possible. CPU optimization studies were conducted in 2017 allowing for critical savings.

2017 b-jet trigger menu changes:
- Global Sequential Calibration (GSC) corrections added to trigger chains
- Expansion of physics centered menus: X→6b, VBF, and use of L1Topo

Performance in 2017 Data at High Pile-Up [6, 7]

In Run-2 high pile-up conditions in excess of 60 interactions per bunch crossing have been reached:
- b-jet trigger online efficiency is consistently high and has low pile-up dependency
- Likewise, fraction of jets in data that pass the online b-tagging is also robust to pile-up
- Demonstrates robustness of the b-jet trigger at multiple b-tagging efficiency operating points

References [7, 8]

Matthew Feickert (Southern Methodist University), on behalf of the ATLAS Collaboration