

Measurement of Z plus Heavy Flavor Jets Differential Cross Section with Full Run-2 ATLAS data

Saturday, 9 April 2022 18:00 (20 minutes)

Measurements of the production rate of Z bosons in association with heavy quarks provide sensitive tests of perturbative quantum chromodynamics (pQCD) predictions, which are made at next-to-leading-order (NLO) accuracy using either a 4-flavor number scheme (4FNS) or 5-flavor number scheme (5FNS). In the 4FNS, b-quarks are not present in the parton distribution functions (PDFs) and only appear as a product of gluon splitting ($g \rightarrow bb$). In the 5FNS, on the other hand, a (massless) b-quark PDF is included. A previous analysis studying $Z \rightarrow ee/\mu\mu + b\text{-jet}$ events using 2015 & 2016 data showed that the 5FNS predictions match the data well, while the 4FNS predictions underestimate the data. The uncertainties are substantial, however. In our analysis we are attempting to further investigate these results by also including Z + c-jet events and looking at the combined “heavy-flavor”(b+c) region to reduce uncertainties. We are also updating the 2015-2016 results with 140 fb^{-1} (up from 35.6 fb^{-1}) of ATLAS Run-2 data at $\sqrt{s} = 13 \text{ TeV}$. This is still a work in progress, but important milestones will be presented.

Career stage

Graduate student

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