Contribution ID: **784** Type: **Parallel session talk**

Automated calculation of Jet fragmentation at NLO in QCD

Friday, 25 August 2023 09:45 (12 minutes)

We present FMNLO, a framework to combine general-purpose Monte Carlo generators and fragmentation functions (FFs). It is based on a hybrid scheme of phase-space slicing method and local subtraction method, and is accurate to next-to-leading order (NLO) in QCD. The new framework has been interfaced to MG5_aMC@NLO and made publicly available in this work. We demonstrate its unique ability by giving theoretical predictions of various fragmentation measurements at the LHC, followed by comparisons with the data. With the help of interpolation techniques, FMNLO allows for fast calculation of fragmentation processes for a large number of different FFs, which makes it a promising tool for future fits of FFs. As an example, we perform an NLO fit of parton fragmentation functions to unidentified charged hadrons using measurements at the LHC. We find the ATLAS data from inclusive dijet production show a strong constraining power. Notable disparities are found between our gluon FF and that of BKK, DSS, and NNFF, indicating the necessity of additional constraints and data for the gluon fragmentation function.

Collaboration / Activity

Collider Phenomenology

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Session Classification: T06 QCD and Hadronic Physics

Track Classification: QCD and Hadronic Physics