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Automated calculation of Jet fragmentation at NLO in QCD

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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 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 comparison 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 a 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 necessities of additional constraints and data for gluon fragmentation function.

Primary authors: 刘, 重阳 (上海交通大学粒子物理与核物理研究所); 沈, 晓民 (上海交通大学粒子物理与核物理研究所); Dr 周, 斌 (上海交通大学粒子物理与核物理研究所); Prof. 高, 俊 (上海交通大学粒子物理与核物理研究所)

Presenter: 刘, 重阳 (上海交通大学粒子物理与核物理研究所)

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