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# Unveiling the Jet Substructure using Julia

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High energetic quarks and gluons, produced in a scattering phenomena, undergoes fragmentation and hadronization, leading to a spray of collimated particles, which are collectively clustered to form jets. In the ultra-high momentum regime, it may often happen that multiple energetic partons are within a geometric vicinity, and the jet thus formed has multiple sub-jets within it. This led to the formulation and study of the jet-substructure paradigm, which has evolved as a sub-branch of QCD studies. Thus, jet substructure has emerged as a powerful framework for studying the Standard Model at particle colliders. The FastJet C++ package provides several modules for jet and jet substructure analysis. This work presents the translation of a few of the functionalities of FastJet, including some of the taggers, groomers, jet filtering, and trimming algorithms, into Julia, highlighting the solutions and challenges we encountered. Additionally, the performance of the Julia implementation is measured with respect to the original FastJet code, and even though a significant improvement is not observed, it holds the potential for further optimizations that could lead to better performance in the future.

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