

# Precision Event Shapes at the LHC: the Transverse Energy-Energy Correlator in the Back-to-Back Limit

*Monday, September 9, 2019 3:00 PM (25 minutes)*

We present an operator based factorization formula for the transverse energy-energy correlator (TEEC) hadron collider event shape in the back-to-back (dijet) limit. This factorization formula exhibits a remarkably symmetric form, being a projection onto a scattering plane of a more standard transverse momentum dependent factorization. Soft radiation is incorporated through a dijet soft function, which can be elegantly obtained to next-to-next-to-leading order (NNLO) due to the symmetries of the problem. We present numerical results for the TEEC resummed to next-to-next-to-leading logarithm (NNLL) matched to fixed order at the LHC. Our results constitute the first NNLL resummation for a dijet event shape observable at a hadron collider, and the first analytic result for a hadron collider dijet soft function at NNLO. We anticipate that the theoretical simplicity of the TEEC observable will make it indispensable for precision studies of QCD at the LHC, and as a playground for theoretical studies of factorization and its violation.

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