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Beautiful and Charming Energy Correlators

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In this talk, we discuss energy correlators within the context of beauty and charm quark jets to illuminate the effects of the intrinsic mass of the elementary particles of QCD. We extend existing factorization theorems to include the mass of heavy quarks and calculate heavy quark jet functions in order to carry out theoretical calculations to next-to-leading logarithmic accuracy. Using this framework, we then observe a clear transition from the scaling region to the region corresponding to the heavy quark mass scale, manifesting the long-sought-after dead-cone effect and illustrating fundamental effects coming from the intrinsic mass of beauty and charm quarks before they are confined inside hadrons. Our theoretical framework for studying energy correlators using heavy jets has many exciting applications for tuning mass effects for parton shower Monte Carlo event generators, probing medium in heavy-ion collisions, and studying heavy flavor fragmentation functions.

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