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Factorization and resummation of non-global logarithms

Wednesday 20 July 2016 09:00 (20 minutes)

In this talk I will introduce our recent work about factorization and resummation for jet processes. From a detailed analysis of Sterman-Weinberg cone-jet cross sections in effective field theory, we obtain novel factorization theorems which separate the physics associated with different energy scales present in such processes. The relevant low-energy physics is encoded in Wilson lines along the directions of the energetic particles inside the jets. This multi-Wilson-line structure is present even for narrow-cone jets due to the relevance of small-angle soft radiation. We discuss the renormalization-group equations satisfied by these operators. Their solution resums all logarithmically enhanced contributions to such processes, including non-global logarithms. Such logarithms arise in many observables, in particular whenever hard phase-space constraints are imposed, and are not captured with standard resummation techniques. Our formalism provides the basis for higher-order logarithmic resummations of jet and other non-global observables. As a nontrivial consistency check, we use it to obtain explicit two-loop results for all logarithmically enhanced terms in cone-jet cross sections and verify those against numerical fixed-order computations. This talk is based on arXiv:1508.06645, arXiv:1605.02737 and some recent progress about numerical results.

Summary

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