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Threshold resummation of new partonic channels at next-to-leading power

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Collider observables involving heavy states are subject to large logarithmic terms near threshold, which must be summed to all orders in perturbation theory to obtain sensible results. Relatively recently, this resummation has been extended to next-to-leading power in the threshold variable, using diagrammatic and effective field theory techniques. In this talk I will present the state of the art and discuss current limitations, related to the appearance of divergent convolutions, which prevent the application of factorization methods known from leading power resummation. To this end I will focus on partonic channels that turn on only at next-to-leading power, in deep inelastic scattering, Drell-Yan and Higgs boson production. I will illustrate how the study of these channels gives us a better understanding of the origin of such singularities. Furthermore, I will show that an explicit all-order form for the leading logarithmic partonic cross section can be obtained by employing d-dimensional consistency relations, derived from requiring $1/\epsilon$ pole cancellations in dimensional regularization between momentum regions.

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