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The KLN theorem meets collinear factorisation

The KLN theorem establishes that infrared divergences in parton-model diagrams cancel when summed alongside diagrams that account for the simultaneous hard interaction of multiple partons within the same hadron. Meanwhile, it is well established that initial-state infrared poles and logarithms are governed by collinear factorisation. In this talk, I introduce a formalism where an initial-state implementation of KLN works hand in hand with collinear factorisation.

I will show that in this framework hadronic cross-sections can be expressed in terms of iterated discontinuities of Feynman diagrams and expanded in virtuality using standard expansion-by-regions techniques. The leading virtuality contribution will be shown to be equivalent to the MSbar parton model result through a universal scheme change. In turn, this enables the application of the Local Unitarity method to the computation of hadronic cross sections.

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