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First results of Local Unitarity at N3LO

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Local Unitarity provides an order-by-order representation of perturbative cross-sections that realises at the local level the cancellation of final-state collinear and soft singularities predicted by the KLN theorem. The representation is obtained by manipulating the real and virtual interference diagrams contributing to transition probabilities using general local identities. As a consequence, the Local Unitarity representation can be directly integrated using Monte Carlo methods and without the need of infrared counter-terms. I will present first results from this new approach with examples up to N3LO accuracy. I will conclude by giving an outlook on future generalisations of the method applicable to hadronic collisions.

Significance

The new results that I will present from Local Unitarity offer a clear path to go beyond the state-of-the-art collider simulations.

References

arXiv:1906.06138, arXiv:2010.01068, arXiv:2203.11038

Experiment context, if any

High-Energy Colliders

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