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Particle Physics at LPTHE

Mardi 23 Avril 2024, 14 :00
LPTHE, library
Domaines : hep-ph

Titre : *New parton showers for present and future colliders*

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Résumé : *Parton shower event generators are essential tools for establishing the quantitative connection between theory and experiment. However, their flexibility comes with a trade-off : they generally offer lower formal accuracy compared to state-of-the-art analytic calculations, which in turn have more limited applicability. The poor accuracy of the inevitably employed parton shower generators introduces systematic uncertainties that affect all measurements at colliders. In this talk, I will discuss the efforts made by the PanScales collaboration to improve the logarithmic accuracy of parton showers. Until recently, this accuracy was limited to the leading logarithms. Specifically, I will demonstrate how we can achieve Next-to-Leading Logarithm (NLL) accuracy for processes involving two colored legs, such as color-singlet production, decay, and deep inelastic scattering. Furthermore, I will explore advancements beyond NLL for observables that are primarily sensitive to soft emissions, such as particle multiplicity and jet vetoes. These developments are crucial for refining our understanding of fundamental particle interactions and reducing uncertainties in present and future collider measurements.*