



Contribution ID: 725

Type: **Oral Presentation**

New Approach to Hard Corrections in Precision QCD for LHC and FCC Physics (15' + 5')

Thursday, 4 August 2016 16:10 (20 minutes)

We present a new approach to the realization of hard fixed-order corrections in predictions for the processes probed in high energy colliding hadron beam devices, with some emphasis on the LHC and the future FCC devices. We show that the usual unphysical divergence of such corrections as one approaches the soft limit is removed in our approach, so that

we would render the standard results to be closer to the observed exclusive distributions. We use the single Z/γ^* production and decay to lepton pairs as our prototypical example, but we stress that the approach has general applicability. In this way, we open another part of the way to rigorous baselines for the determination of the theoretical precision tags for LHC physics, with an obvious generalization to the future FCC as well.

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Session Classification: Strong Interactions and Hadron Physics

Track Classification: Strong Interactions and Hadron Physics