## **Resummation, Evolution, Factorization 2022**



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## Prospects for strong coupling measurement at hadron colliders using soft-drop jet mass

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We compute the soft-drop jet-mass distribution from pp collisions to NNLL accuracy while including nonperturbative corrections through a field-theory based formalism. Using these calculations, we assess the theoretical uncertainties on an  $\alpha_s$  precision measurement due to higher-order perturbative effects, nonperturbative corrections, and PDF uncertainty. We identify which soft-drop parameters are well-suited for measuring  $\alpha_s$ , and find that higher-logarithmic resummation has a qualitatively important effect on the shape of the jet mass distribution. We find that gluon jets are more sensitive to  $\alpha_s$  than quark jets, and show that experimentally distinguishing quark and gluon jets is not required for this  $\alpha_s$  measurement. We conclude that measuring  $\alpha_s$  to the 10% level is feasible but getting down to the 1% level to be competitive with other state-of-the-art measurements will be challenging.

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