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## Reducing the Top Quark Mass Uncertainty with Jet Grooming

The measurement of the top quark mass has large systematic uncertainties coming from the Monte Carlo simulations that are used to match theory and experiment. We explore how much that uncertainty can be reduced by using jet grooming procedures. We estimate the inherent ambiguity in what is meant by Monte Carlo mass to be around 530 MeV without any corrections. This uncertainty can be reduced by 60% to 200 MeV by calibrating to the W mass and a further 33% to 140 MeV by applying soft-drop jet grooming (or by 20% more to 170 MeV with trimming). At e+e- colliders, the associated uncertainty is around 110 MeV, reducing to 50 MeV after calibrating to the W mass. By analyzing the tuning parameters, we conclude that the importance of jet grooming after calibrating to the W mass is to reduce sensitivity to the underlying event.

**Primary authors:** ANDREASSEN, Anders (Harvard University); SCHWARTZ, Matthew

**Presenter:** ANDREASSEN, Anders (Harvard University)

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