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Type: **Parallel session talk**

Precision top mass measurement

Tuesday 22 August 2023 16:40 (20 minutes)

Duration: 15'+5'

Current measurements of the top mass have achieved a precision of less than 500 MeV. However, these measurements, relying on Monte Carlo Simulations, are affected by the top mass interpretation problem, introducing a theory uncertainty of $\mathcal{O}(1 \text{ GeV})$. To address this challenge, accurate first principles calculations in short distance schemes are needed, allowing direct comparison with unfolded LHC data. This talk presents two complementary observables, the soft drop jet mass (Phys. Rev. D 100, 074021) and the 3-point energy correlator (Phys. Rev. D 107, 114002), where precise hadron-level predictions for the top mass can be achieved. I will review recent advancements in these approaches, including a new NNLL prediction for the soft drop jet mass in top quark jets that incorporates first principles treatment of hadronization corrections. Additionally, I will present an improved calibration of the Monte Carlo top mass parameter in collaboration with ATLAS, using the new theory input.

Collaboration / Activity

DESY Theory Group

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