Weakness or Strength in the Golden Years of RHIC and LHC?

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We present comparisons of the latest pQCD- and AdS/CFT-based energy loss models with the newest highpT measurements from RHIC and LHC. Zero parameter predictions of energy loss from WHDG rigorously constrained to PHENIX pi0 RAA data show quantitative agreement with the measured azimuthal anisotropy and D meson suppression at LHC. pQCD predictions follow the qualitative trend of the LHC light hadron suppression, and we report on progress in including next-to-leading order effects which could provide the key ingredient needed for quantitative agreement. LHC D meson predictions from AdS/CFT are oversuppressed compared to data when constrained to RHIC non-photonic electron data, although due to the large experimental uncertainties, the method is not falsified. We also present for the first time theoretically controlled AdS/CFT predictions for light particle suppression, which also suggest that strong-coupling methods leads to a too-large suppression. Finally, we emphasize how the comparison of mass-dependent energy loss calculations to data provides a powerful tool for determining the dominant energy loss mechanism in heavy ion collisions.

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