

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 high- p_T measurements from RHIC and LHC. Zero parameter predictions of energy loss from WHDG rigorously constrained to PHENIX π^0 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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