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Jet quenching in the smallest systems: pQCD predictions for R_{AB} and the absence of high- p_T v_2

We present predictions from a perturbative quantum chromodynamics energy loss model that includes small system size corrections and event-by-event hydrodynamic evolution of the medium. The effective strong coupling is constrained by a rigorous statistical analysis of high- p_T suppression data from central heavy-ion collisions at RHIC and LHC.

Extrapolating downwards in system size, we find quantitative agreement with recent Ne + Ne and O + O R_{AA} measurements, and measurable suppression persisting in very light ions down to $^3\text{He} + ^3\text{He}$, where deep inelastic scattering data tightly constrain the nPDF baseline.

Strikingly, the same model predicts $v_2 \approx 0$ at high- p_T for all small systems. We argue this prediction is generic to energy loss models when v_2 is extracted via the standard experimental method of hard-soft correlations, due to a geometric decorrelation between the hard and soft sector participant planes.

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