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Jet transport coefficient qhat in lattice QCD

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We present the first calculation of the jet transport coefficient $\hat{q}$ in quenched and (2+1)-flavor QCD on a 4-D Euclidean lattice. The light-like propagation of an energetic parton is factorized from the mean square gain in momentum transverse to the direction of propagation, which is expressed in terms of the thermal field-strength field-strength correlator. The leading-twist term in its operator product expansion is calculated on the lattice. Continuum extrapolated quenched results, and full QCD estimates based on un-renormalized lattice data, over multiple lattice sizes, are compared with (non) perturbative calculations and phenomenological extractions of $\hat{q}$. The lattice data for $\hat{q}$ show a temperature dependence similar to the entropy density. Within uncertainties, these are consistent with phenomenological extractions, contrary to calculations using perturbation theory.

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