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Gauge invariant definition of the jet quenching parameter \hat{q}

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The jet quenching parameter \hat{q} describes the transverse momentum broadening of a high-energy parton moving through a thermal medium. In the past, several authors were able to relate this quantity to the expectation value of two light-cone Wilson lines. Recently, the results were reobtained in a systematic way by employing effective field theory methods (Soft-Collinear Effective Theory). However, the calculations were only explicitly performed in a covariant gauge. General arguments were given, motivating the generalization of this result through the addition of transverse gauge links but the explicit derivation of this in effective field theory terms is missing. In this talk I will discuss how the adoption of a general gauge changes the picture and gives rise to a gauge invariant definition of the jet quenching parameter \hat{q}. Furthermore I will comment on practical applications of this result.

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