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Energy momentum tensor associated with hard parton production in finite time

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Particle physics has had remarkable success in describing collider data using usual Feynman diagram techniques, but little is understood regarding particles during the time of interaction. We use the Schwinger-Keldysh finite-time formalism applied to an interacting scalar field theory to derive a perturbative expression for the energy momentum tensor associated with hard particle production. This is used as a foundational model to study jet production in the QGP.

Possible applications include perturbative calculations of dispersion relations for interacting non-linear field theories, insight into the flow of momentum for off-shell particles, and the creation of a hybrid early-time pQCD/late-time AdS/CFT energy loss model to describe high momentum observables in heavy-ion collisions.

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