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Jet energy loss in a flowing plasma

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We present new results on the energy loss of light partons traversing a highly dynamical strongly coupled quark-gluon plasma. As QGP has large gradients in both temperature and the fluid velocity, it is crucial to study energy loss without assuming a homogeneous plasma, especially as it is known that energy loss depends on the plasma evolution in a non-local way. In a holographic description, we consider several subsequent improvements of the hydrodynamic background by keeping increasing orders in the gradient expansion. Already for varying temperature and velocity profiles and ideal hydrodynamics, the energy loss is considerably modified. However, this description is limited to very small gradients and it is hence necessary to include viscous corrections. We present a numerical analysis of jet energy loss in a boost-invariant and transversely-expanding droplet of QGP. We find that depending on the direction of the fluid flow, the velocity gradients can change the distance a parton can travel by a factor of two, which would correspond to changing the coupling constant by a factor of more than fifty.

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