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Can transport peak explain the low-mass enhancement of dileptons at RHIC?

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We propose a novel relation between the low-mass enhancement of dielectrons observed at PHENIX and transport coefficients of QGP such as the charge diffusion constant D and the relaxation time \tau. The observed low-mass enhancement sets a lower-bound on the diffusion constant, D > 2/T, with T being temperature.

To reach this lower bound, we start with the second-order relativistic
dissipative hydrodynamics by Israel and Stewart. The linearized hydrodynamic equation in external electromagnetic field gives a spectral function which is parametrized by D and \tau. Combining the spectral function with the full 3D hydrodynamic evolution, theoretical dielectron spectra and the experimental data are compared.

Detailed analysis shows that the low-mass dilepton enhancement originates mainly from the high-temperature QGP phase where there is a large electric charge fluctuation as obtained from lattice QCD simulations.

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