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Unveiling the shear viscosity to entropy density ratio with gravity analogs

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One of the most intriguing aspects of strongly coupled quark gluon plasma is near perfect fluidity observed in relativistic heavy-ion collisions. One way of quantifying this property is by means of the shear viscosity to entropy density ratio η/s . Within the AdS/CFT correspondence, it has been conjectured by Kovtun, Son and Starinets that a universal lower bound $1/4\pi$ exists. We present a new perspective on this matter in the framework of analogue gravity models, focusing on relativistic fluids with transonic flow. Quantum fluctuations

at the acoustic horizon, the fluid analog of the event horizon of a black hole, result in a thermal radiation of phonons, the sonic analog of the Hawking radiation. Adopting a covariant relativistic kinetic theory, we describe

the Hawking emission as a dissipative process. Neglecting phonon's self interactions, we find the saturation of η/s . We connect the KSS bound to the absence of a gap in the low energy spectrum of long-wavelength excitations.

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