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Influence of Finite Chemical Potential on Hadronic Shear Viscosity[1] NASSER DEMIR, STEFFEN A. BASS, Duke University — Ultra-relativistic heavy-ion collisions at the Relativistic Heavy-Ion Collider (RHIC) are thought to have created a Quark-Gluon-Plasma, characterized by a very small shear viscosity to entropy ratio η/s, close to the lower bound predicted for that quantity by string theory. However, due to the dynamics of the collision, the produced matter passes through a phase characterized by an expanding and rapidly cooling hadron gas with strongly increasing viscosity to entropy ratio. Such a rise in η/s would not be compatible with the success of (viscous) hydrodynamics, which requires a very small value of η/s throughout the full evolution of the reaction in order to successfully describe the collective flow seen in the experiments. Here we show that the inclusion of a pion chemical potential, which is bound to arise due to the separation of chemical and kinetic freeze-out during the collision evolution, will keep the value of η/s sufficiently small to ensure the successful application of (viscous) hydrodynamics to collisions at RHIC.

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