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Microscopic Transport Approaches to Analyzing Hadronic Matter NASSER DEMIR, STEFFEN BASS, Department of Physics, Duke University — Ultra-relativistic heavy-ion collisions at RHIC are thought to have created a strongly interacting Quark-Gluon-Plasma (sQGP) with a very low shear viscosity in the deconfined phase. However, as the sQGP hadronizes it will evolve through a hadronic phase with rapidly increasing viscosity. In order to fully characterize the sQGP state, one has to separately determine the viscosity of the hadronic phase. Here, we present a calculation of the shear viscosity coefficient of hadronic matter in equilibrium for a range of initial conditions and energy and baryon number densities. The dynamics of the particles comprising this medium are simulated using the Ultrarelativistic Quantum Molecular Dynamics (UrQMD) model in a box with periodic boundary conditions. Green-Kubo theory enables us to compute linear transport coefficients of a medium by examining fluctuations of the system's stress-energy tensor near equilibrium. We outline how to apply this approach to compute other transport coefficients, such as the baryon diffusion constant of hadronic matter. We also sketch an algorithm that combines the Green-Kubo formalism and our microscopic transport model to analyze the time evolution of the shear viscosity of a sytem gradually drifting out of equilibrium.

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