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Transport properties of nucleons[1]

SERGEY POSTNIKOV, MADAPPA PRAKASH, Ohio University — Results for the coefficients of diffusion, thermal conductivity, bulk and shear viscosities of a homogeneous system of nucleons will be presented. In the nondegenerate regime, the Chapman-Enskog theory provides an approximate solution to the Boltzmann equation and casts the transport properties in terms of appropriate transport integrals. In this case, the necessary differential cross sections are calculated using phase shifts extracted from scattering experiments. In the degenerate regime, many-body methods developed in the context of liquid helium-3 are employed. Techniques to cover the partially degenerate regime are also explored. The extent to which these transport coefficients are relevant in the dynamical evolutions of supernovae and neutron stars will be examined.

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