

Energy conservation for compressible fluid systems with Korteweg stress tensors

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Abstract

Energy conservation is an important issue in Onsager's conjecture. In this talk, we consider the weak solutions of compressible quantum Euler system and quantum Navier-Stokes system under what regularity conditions conserve the energy. Based on the work of Bresch et al. (Arch. Rational Mech. Anal. 223: 975-1025, 2019) and Feireisl et al. (Arch. Ration. Mech. Anal. 223: 1375-1395, 2017), we introduce the drift velocity and the effective velocity to write the two quantum fluid systems and obtain the corresponding augmented systems as the compressible Navier-Stokes system with density dependent viscosity, then prove the energy conservation for the augmented system, which eliminate the third order dispersive term. We find some new observations and phenomena, which is different from the previous results.

Keywords: Quantum fluid systems; Energy conservation; Onsager's conjecture