Alves, Nuno J.; **Tzavaras, Athanasios E.**

The relaxation limit of bipolar fluid models. (English) Zbl 1481.35318

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Summary: This work establishes the relaxation limit from the bipolar Euler-Poisson system to the bipolar drift-diffusion system, for data so that the latter has a smooth solution. A relative energy identity is developed for the bipolar fluid models, and it is used to show that a dissipative weak solution of the bipolar Euler-Poisson system converges in the high-friction regime to a strong and bounded away from vacuum solution of the bipolar drift-diffusion system.

MSC:

35Q35 PDEs in connection with fluid mechanics
35Q20 Boltzmann equations
35L65 Hyperbolic conservation laws
35K55 Nonlinear parabolic equations
76A05 Non-Newtonian fluids
76W05 Magnetohydrodynamics and electrohydrodynamics
35B65 Smoothness and regularity of solutions to PDEs
35D30 Weak solutions to PDEs
35D35 Strong solutions to PDEs
82D37 Statistical mechanics of semiconductors

Keywords:

bipolar Euler-Poisson; bipolar drift-diffusion; relaxation limit; high-friction limit; relative energy

Full Text: DOI arXiv

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