Diffusion limit
in a model of radiative flow

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Abstract

We consider "relativistic" and "semi-relativistic" models of radiative viscous compressible Navier-Stokes-Fourier system coupled to the radiative transfer equation extending the classical model introduced in [4] and we study some of its singular limits (diffusion limit). We prove the convergence toward the compressible Navier-Stokes with modified state functions (equilibrium case) or toward the compressible Navier-Stokes coupled to a diffusion equation (non equilibrium case) [1, 2]. Finally, we prove the convergence of this coupled system toward a compressible Navier-Stokes-Fourier system coupled to a stationary radiative transfer equation [3].

Keywords: Radiation hydrodynamics, Navier-Stokes-Fourier system, weak solution, diffusion limits, relativistic and semi-relativistic models

References

[1] B. Ducomet, Š. Nečasová, Diffusion limits in a model of radiative flow, Accepted in Anal. di Ferrara.

[2] B. Ducomet, Š. Nečasová, Singular limits in a model of radiative flow, Submitted.

[3] B. Ducomet, Š. Nečasová, Non-relativistic limit in a model of radiative flow,Preprint 2014.

[4] B. Ducomet, E. Feireisl and Š. Nečasová, On a model of radiation hydrodynamics. Ann. I. H. Poincaré-AN 28:797–812, (2011).