

Bisi, M.; Desvillettes, L.

From reactive Boltzmann equations to reaction-diffusion systems. (English) Zbl 1134.82323
J. Stat. Phys. 124, No. 2-4, 881-912 (2006).

This article was printed twice in the journal. For a review, see [Zbl 1105.82022](#).

MSC:

82C40 Kinetic theory of gases in time-dependent statistical mechanics
82C70 Transport processes in time-dependent statistical mechanics
35F20 Nonlinear first-order PDEs
35K57 Reaction-diffusion equations

Cited in 11 Documents

Keywords:

[reaction-diffusion](#); [Boltzmann equation](#); [diffusion approximation](#)

Full Text: [DOI](#)

References:

- [1] M. Abramowitz and I. A. Stegun (Eds.). Handbook of Mathematical Functions (Dover, New York, 1965).
- [2] M. Bisi, M. Groppi, and G. Spiga, Grad's distribution functions in the kinetic equations for a chemical reaction. *Contin. Mech. Thermodyn.* 14:207–222 (2002). · [Zbl 0996.76093](#) · [doi:10.1007/s001610100066](#)
- [3] C. Cercignani. The Boltzmann Equation and its Applications (Springer Verlag, New York, 1988). · [Zbl 0646.76001](#)
- [4] S. Chapman, and T. G. Cowling. The Mathematical Theory of Non-uniform Gases (Cambridge University Press, Cambridge, 1970). · [Zbl 0063.00782](#)
- [5] V. Giovangigli. Multicomponent Flow Modeling (Birkhäuser, Boston, 1999). · [Zbl 0956.76003](#)
- [6] R. Dautray and J. L. Lions. Analyse mathématique et calcul numérique pour les sciences et les techniques, Vol. 9, Evolution: numérique, transport (Paris, MASSON, 1988).
- [7] P. Degond and B. Lucquin-Desreux. Transport coefficients of plasmas and disparate mass binary gases. *Transport Theory Statist. Phys.* 25:595–633 (1996). · [Zbl 0909.35108](#) · [doi:10.1080/00411459608222915](#)
- [8] P. Degond and B. Lucquin-Desreux. The asymptotics of collision operators for two species of particles of disparate masses. *Math. Models Methods Appl. Sci.* 6:405–436 (1996). · [Zbl 0853.76079](#) · [doi:10.1142/S0218202596000158](#)
- [9] A. De Masi, P. A. Ferrari and J. L. Lebowitz. Reaction-Diffusion equations for interacting particle systems. *J. Stat. Phys.* 44:589–644 (1986). · [Zbl 0629.60107](#) · [doi:10.1007/BF01011311](#)
- [10] A. De Masi and E. Presutti. Mathematical methods for hydrodynamic limits (Springer-Verlag, Berlin, 1991). · [Zbl 0754.60122](#)
- [11] L. Desvillettes and F. Golse. A remark concerning the Chapman-Enskog asymptotics. *Ser. Adv. Math. Appl. Sci.* 22:191–203 (1992). · [Zbl 0863.76071](#)
- [12] L. Desvillettes, R. Monaco and F. Salvarani. A kinetic model allowing to obtain the energy law of polytropic gases in the presence of chemical reactions. *European Journal of Mechanics B/ Fluids* 24:219–236 (2005). · [Zbl 1060.76100](#) · [doi:10.1016/j.euromechflu.2004.07.004](#)
- [13] T. Goudon and P. Lafitte. A coupled model for radiative transfer: Doppler effects, equilibrium and non equilibrium diffusion asymptotics, Preprint. · [Zbl 1236.85006](#)
- [14] M. Groppi and G. Spiga. Kinetic approach to chemical reactions and inelastic transitions in a rarefied gas. *J. Math. Chem.* 26:197–219 (1999). · [Zbl 1048.92502](#) · [doi:10.1023/A:1019194113816](#)
- [15] A. Rossani and G. Spiga. A note on the kinetic theory of chemically reacting gases. *Physica A* 272:563–573 (1999). · [doi:10.1016/S0378-4371\(99\)00336-2](#)
- [16] F. Rothe. Global Solutions of Reaction-Diffusion Systems. Lecture Notes in Mathematics (Springer, Berlin, 1984). · [Zbl 0546.35003](#)
- [17] R. Spigler and D. H. Zanette. Reaction-diffusion models from the Fokker-Planck formulation of chemical processes. *IMA J. Appl. Math.* 49:217–229 (1992). · [Zbl 0766.35021](#) · [doi:10.1093/imamat/49.3.217](#)
- [18] R. Spigler and D. H. Zanette. Asymptotic analysis and reaction-diffusion approximation for BGK kinetic models of chemical processes in multispecies gas mixtures. *J. Appl. Math. Phys. (ZAMP)* 44:812–827 (1993). · [Zbl 0784.76108](#) · [doi:10.1007/BF00942811](#)
- [19] R. Spigler and D. H. Zanette. A BGK model for chemical processes: The reaction-diffusion approximation. *Math. Mod. Meth. Appl. Sci.* 4:35–47 (1994). · [Zbl 0814.92024](#) · [doi:10.1142/S0218202594000042](#)
- [20] A. S. Sznitman. Propagation of Chaos for a System of Annihilating Brownian Spheres. *Comm. Pure Appl. Math.* 40:663–690 (1987). · [Zbl 0669.60094](#) · [doi:10.1002/cpa.3160400602](#)
- [21] D. H. Zanette. Linear and nonlinear diffusion and reaction-diffusion equations from discrete-velocity kinetic models. *J. Phys.*

A: Math. Gen. 26:5339–5349 (1993). · Zbl 0808.60073 · doi:10.1088/0305-4470/26/20/019

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.