ABBREVIATED CURRICULUM VITAE

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Born: July 26th 1960 (Castelló de la Ribera, Valencia, Spain)
Nationality: Spanish

Education

University of Valencia, Spain (September 30th 1986)
Ph.D. in Physics, *Sobresaliente Cum Laude*
University of Valencia, Spain (September 1984)
BS., M.S. in Physics

Employment

Professor, University of Extremadura, Spain, Department of Physics (Nov 2000–present)
Associate Professor, University of Extremadura, Spain, Department of Physics (Aug 1989 – Nov 2000)
Teaching Assistant, University of Sevilla, Spain, Department of Theoretical Physics (February 1988–July 1989)
Research Assistant, University of Valencia, Spain, Department of Thermodynamics (January 1985–December 1987)

Visiting appointments

Visiting Faculty, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Japan (June 2018)
Visiting Faculty, Departamento de Física, Universidad de Chile, Santiago, Chile (March 2017)
Visiting Faculty, LPTMS, Université Paris-Sud, France (May-June 2015)
Visiting Faculty, Department of Chemical and Biological Engineering, University of Colorado, USA (August 2014)
Visiting Faculty, LPTMS, Université Paris-Sud, France (June 2012)
Visiting Faculty, Department of Chemical and Biological Engineering, University of Colorado, USA (June 2011)
Visiting Faculty, LPTMS, Université Paris-Sud, France (June 2010)
Visiting Faculty, LPTMS, Université Paris-Sud, France (May 2009)
Visiting Faculty, Department of Physics, University of Florida, USA (May 2006)
Visiting Faculty, Department of Physics, University of Florida, USA (Aug 1998–June 1999)
Visiting Faculty, IIM-UNAM, México (May 1994–June 1994)
Visiting Faculty, IIM-UNAM, México (Sept 1990–June 1991)

Awards

- Quality Research Prize (shared with Andrés Santos) for the book *Kinetic Theory of Gases in Shear Flows. Nonlinear Transport* (Kluwer Academic Publishers, Dordrecht, 2003), University of Extremadura, 2004.

- University of Extremadura, Best PhD in Physics Award to advisee, J.M. Montanero (1996), C. Marín (1997), A. Astillero (2007), R. Gómez González (2023).
- Excellence Prize to Research Trajectory (2017). University of Extremadura.
- Excellence Prize for Teaching Trajectory (2021). University of Extremadura.

Current Research Interests

- **Kinetic Theory of dilute gases in far from equilibrium states**: Boltzmann kinetic equation; Kinetic models; Non linear transport; Monte Carlo simulations.
- **Granular fluids**: Boltzmann and Enskog kinetic equations for inelastic hard spheres; Transport coefficients for monodisperse and multicomponent granular fluids; Exact results for inelastic Maxwell models; Computer simulations.
- **Gas-solid flows**: Kinetic equations for suspensions; Viscous drag force; Navier-Stokes transport coefficients; Vortex instabilities.

PUBLICATIONS

Monographs

1. Vicente Garzó and Andrés Santos, *Kinetic Theory of Gases in Shear Flow, Nonlinear Transport* (Kluwer Academic Publishers, Dordrecht, 2003).
2. Vicente Garzó, *Granular Gaseous Flows. A Kinetic Theory Approach to Granular Gaseous Flows* (Springer Nature, Cham, 2019).

Original papers in Regular Journals

1. V. Garzó and J. de la Rubia, *Coupling between shear flow and temperature gradient for the very hard particle interaction,* Chem. Phys. Lett. **132**, 526-530 (1986).

2. A. Santos, J. J. Brey, and V. Garzó, *A kinetic model for steady heat flow*, Phys. Rev. A **34**, 5047-5050 (1986).

3. V. Garzó, *Generalized transport coefficients in a gas with large shear rate*, Mol. Phys. **61**, 421-432 (1987).

4. V. Garzó and J. de la Rubia, *The Hilbert expansion of the BGK equation*, Chem. Phys. Lett. **135**, 143-146 (1987).

5. V. Garzó, *Transport properties in disparate-mass binary gases*, Chem. Phys. Lett. **141**, 255-260 (1987).

6. V. Garzó and J. de la Rubia, *Solution of the BGK model kinetic to study a system with a constant temperature gradient*, Anales de Física A **84**, 25-30 (1988).

7. V. Garzó, *On the derivation of the Burnett hydrodynamic equations from the Hilbert expansion*, Physica A **149**, 551-560 (1988).

8. V. Garzó, *Perturbative solution of the BGK equation for very hard particle interaction*, Mol. Phys. **63**, 517-521 (1988).

9. V. Garzó, A. Santos, and J. J. Brey, *A kinetic model for a multicomponent gas*, Phys. Fluids A **1**, 380-383 (1989).

10. V. Garzó, A. Santos, and J. J. Brey, *Influence of nonconservative external forces on self-diffusion in dilute gases*, Physica A **163**, 651-671 (1990).

11. V. Garzó and A. Santos, *Divergence of the nonlinear thermal conductivity in the homogeneous heat flow*, Chem. Phys. Lett. **177**, 79-83 (1991).

12. V. Garzó and M. López de Haro, *Tracer diffusion in shear flow*, Phys. Rev. A **44**, 1397-1400 (1991).

13. V. Garzó and A. Santos, *Exact solution of the Boltzmann equation in the homogeneous color conductivity problem*, J. Stat. Phys. **65**, 747-760 (1991).

14. V. Garzó, *Transport equations from the Liu model,* Phys. Fluids A **3**, 1980-1982 (1991).

15. A. Santos and V. Garzó, *An exact solution of the Boltzmann equation for a binary mixture,* Transp. Theory and Stat. Phys. **21**, 403-416 (1992).

16. V. Garzó and M. López de Haro, *Kinetic models for diffusion in shear flow*, Phys. Fluids A **4**, 1057-1069 (1992).

17. V. Garzó and A. Santos, *Nonlinear mass and momentum transport in a dilute gas*, J. Chem. Phys. **97**, 2039-2045 (1992).

18. A. Santos and V. Garzó, *Self-diffusion in a dilute gas under heat and momentum transport*, Phys. Rev. A **46**, 3276-3287 (1992).

19. A. Santos, V. Garzó, and J. J. Brey, *Comparison between the homogeneous-shear and the sliding-boundary methods to produce shear flow,* Phys. Rev. A **46**, 8018-8020 (1992).

20. V. Garzó and A. Santos, *Color conductivity induced by a shear-rate dependent color field*, J. Chem. Phys. **98**, 6569-6570 (1993).

21. V. Garzó, *Kinetic model for transport around uniform shear flow*, Mol. Phys. **78**, 1129-1141 (1993).

22. V. Garzó and M. López de Haro, *Effect of mass-ratio dependence of the force law for tracer diffusion in shear flow,* Phys. Fluids A **5**, 1059-1061 (1993).

23. M. López de Haro and V. Garzó, *On the Burnett equations for a dense monatomic hard-sphere gas*, Physica A **197**, 98-112 (1993).

24. J. J. Brey, A. Santos, and V. Garzó, *Analysis of the Evans and Baranyai variational principle in dilute gases*, Phys. Rev. Lett. **70**, 2730-2733 (1993).

25. V. Garzó and A. Santos, *Heat and momentum transport in a gaseous dilute solution*, Phys. Rev. E **48**, 256-262 (1993).

26. V. Garzó, *Thermal conductivity of a dilute gas in a thermostatted shear-flow state*, Phys. Rev. E **48**, 3589-3593 (1993).

27. A. Santos, V. Garzó, J. J. Brey, and J. W. Dufty, *Singular behavior of shear flow far from equilibrium*, Phys. Rev. Lett. **71**, 3971-3974 (1993).

28. J. M. Montanero, M. Alaoui, A. Santos, and V. Garzó, *Monte Carlo simulation of the Boltzmann equation for steady Fourier flow*, Phys. Rev. E **49**, 367-375 (1994).

29. C. Marín, V. Garzó, and A. Santos, *Nonlinear transport in a dilute binary mixture of mechanically different particles*, J. Stat. Phys. **75**, 797-816 (1994).

30. V. Garzó, *Heat flux induced by an external force in a strongly shearing dilute gas*, J. Chem. Phys. **101**, 1423-1430 (1994).

31. V. Garzó and M. López de Haro, *Kinetic model for heat and momentum transport*, Phys. Fluids **6**, 3787-3794 (1994).

32. A. Santos and V. Garzó, *Exact moment solution of the Boltzmann equation for uniform shear flow*, Physica A **213**, 409-425 (1995).

33. V. Garzó and A. Santos, *Comparison between the Boltzmann and Bhatnagar-Gross-Krook equations for uniform shear flow*, Physica A **213**, 426-434 (1995).

34. A. Santos, V. Garzó, and J. J. Brey, *On the validity of a variational principle for far-from-equilibrium steady states*, Europhys. Lett. **29**, 693-698 (1995).

35. V. Garzó and M. López de Haro, *Tracer diffusion under shear flow for general repulsive interactions*, Phys. Fluids **7**, 478-486 (1995).

36. V. Garzó, *Heat transport in a dilute gas under uniform shear flow*, Phys. Rev. E **51**, 3156-3163 (1995).

37. J. M. Montanero, A. Santos, and V. Garzó, *Analysis of the stability of the uniform shear flow from a Monte Carlo simulation of the Boltzmann equation*, Phys. Lett. A **203**, 73-76 (1995).

38. V. Garzó, *Thermal transport generated by an external force in a sheared dilute gas*, J. Chem. Phys. **103**, 4626-4631 (1995).

39. J. M. Montanero, A. Santos, and V. Garzó, *Does the Gaussian thermostat maximize the phase-space compression factor?*, J. Stat. Phys. **81**, 989-1005 (1995).

40. C. Marín, V. Garzó, and A. Santos, *Transport properties in a binary mixture under shear flow*, Phys. Rev. E **52**, 3812-3819 (1995).

41. V. Garzó and A. Santos, *Diffusion in a gaseous dilute solution under heat and momentum transport*, Phys. Rev. E **52**, 4942-4951 (1995).

42. M. López de Haro and V. Garzó, *Shock waves in a dense gas*, Phys. Rev. E **52**, 5688-5691 (1995).

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46. J. M. Montanero, A. Santos, and V. Garzó, *Monte Carlo simulation of the Boltzmann equation for uniform shear flow*, Phys. Fluids **8**, 1981-1983 (1996).

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54. C. Marín, V. Garzó, and A. Santos, *Tracer limit in a gas mixture under shear flow with repulsive interactions*, Phys. Rev. E **56**, 2291-2294 (1997).

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57. V. Garzó, *Electrical conductivity in a dilute gas far from equilibrium*, Phys. Rev. E **57**, 4186-4197 (1998).

58. J. M. Montanero and V. Garzó, *Nonlinear Couette flow in a dilute gas: Comparison between theory and molecular dynamics simulation,* Phys. Rev. E **58**, 1836-1842 (1998).

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66. C. Marín, V. Garzó, and M. López de Haro, *Shear-rate dependent transport coefficients in a binary mixture of Maxwell molecules,* Phys. Fluids **12**, 717-726 (2000).

67. J. M. Montanero, A. Santos, and V. V. Garzó, *Monte Carlo simulation of nonlinear Couette flow in a dilute gas,* Phys. Fluids **12**, 3060-3073 (2000).

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69. M. Tij, E. E. Tahiri, J. M. Montanero, V. Garzó, A. Santos, and J. W. Dufty, *Nonlinear Couette flow in a low density granular gas,* J. Stat. Phys. **103**, 1035-1068 (2001).

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73. V. Garzó and J. W. Dufty, *Hydrodynamics for a granular mixture at low density*, Phys. Fluids **14**, 1476-1490 (2002).

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76. V. Garzó, *Tracer diffusion in granular shear flows,* Phys. Rev. E **66**, 0210308 (2002).

77. V. Garzó and J. M. Montanero, *Transport coefficients of a heated granular gas,* Physica A **313**, 336-356 (2002).

78. S. R. Dahl, C. M. Hrenya, V. Garzó, and J. W. Dufty, *Kinetic temperatures for a granular mixture,* Phys. Rev. E **66**, 041301 (2002).

79. J. M. Montanero and V. Garzó, *Shear viscosity for a heated granular mixture at low-density,* Phys. Rev. E **67**, 021308 (2003).

80. J. M. Montanero and V. Garzó, *Energy nonequipartition in a sheared granular mixture,* Mol. Sim. **29**, 357-362 (2003).

81. V. Garzó, *Nonlinear transport in inelastic Maxwell mixtures under simple shear flow,* J. Stat. Phys. **112**, 657-683 (2003).

82. V. Garzó and J. M. Montanero, *Shear viscosity for a moderately dense granular binary mixture,* Phys. Rev. E **68**, 041302 (2003).

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84. V. Garzó and J. M. Montanero, *Diffusion of impurities in a granular gas,* Phys. Rev. E **68**, 021301 (2004).

85. A. Santos, V. Garzó and J. W. Dufty, *Inherent rheology of a granular fluid in uniform shear flow,* Phys. Rev. E **69**, 061303 (2004).

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90. V. Garzó, *Transport coefficients for an inelastic gas around uniform shear flow: Linear stability analysis,* Phys. Rev. E **73**, 021304 (2006).

91. V. Garzó, *Segregation in granular binary mixtures: Thermal diffusion,* Europhys. Lett. **75**, 521-527 (2006).

92. V. Garzó, J. M. Montanero, and J. W. Dufty *Mass and heat fluxes for a binary granular mixture at low density,* Phys. Fluids **18**, 083305 (2006).

93. J.M. Montanero, A. Santos, and V. Garzó, *First-order Chapman-Enskog velocity distribution function in a granular gas,* Physica A **376**, 75-93 (2007).

94. V. Garzó, A. Santos, and J.M. Montanero, *Modifed Sonine approximation for the Navier-Stokes transport coefficients of a granular gas,* Physica A **376**, 94-107 (2007).

95. V. Garzó, *Mass transport of an impurity in a strongly sheared granular gas,* J. Stat. Mech. P02012 (2007).

96. V. Garzó and J. M. Montanero, *Hydrodynamics for inelastic Maxwell mixtures: Some applications,* Bulletin of the Institute of Mathematics, Academica Sinica (New Series) **2**, 155-177 (2007.

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101. V. Garzó, *Shear-rate dependent transport coefficients for inelastic Maxwell models,* J. Phys. A: Math. Theor. **40**, 10729-10757 (2007).

102. A. Santos and V. Garzó, *Simple shear flow in inelastic Maxwell models,* J. Stat. Mech. P08021 (2007).

103. V. Garzó and A. Santos, *Third and fourth degree collisional moments for inelastic Maxwell models,* J. Phys. A: Math. Theor. **40**, 14927-14943 (2007).

104. V. Garzó, *Mass flux of a binary mixture of Maxwell molecules under shear flow,* Physica A **387**, 3423-3431 (2008).

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112. F. Vega Reyes, A. Santos and V. Garzó, *Non-Newtonian granular hydrodynamics. What do the inelastic simple shear flow and the elastic Fourier flow have in common?,* Phys. Rev. Lett. **104**, 028001 (2010).

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114. V. Garzó and F. Vega Reyes, *Segregation by thermal diffusion in granular shear flows,* J. Stat. Mech. P07024 (2010).

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123. J. A. Murray, V. Garzó and C. M. Hrenya, *Enskog kinetic theory for polydisperse granular mixtures. III. Comparison of dense and dilute transport coefficients and equations of state for a binary mixture*, Powder Technology **220**, 24-36 (2012).

124. V. Garzó and F. Vega Reyes, *Segregation of an intruder in a heated granular gas,* Phys. Rev. E **85**, 021308 (2012).

125. P. P. Mitrano, V. Garzó, A. H. Hilger, C. J. Ewasko, and C. M. Hrenya, *Assessing a modified-Sonine kinetic theory for instabilities in highly dissipative, cooling granular gases,* Phys. Rev. E **85**, 041303 (2012).

126. V. Garzó and E. Trizac, *Dissipative homogeneous Maxwell mixtures: ordering transition in the tracer limit,* Granular Matter **14**, 99-104 (2012).

127. A. Santos and V. Garzó, *Collisional rates for the inelastic Maxwell model: applications to the divergence of anisotropic high-order velocity moments in the homogeneous cooling state*, Granular Matter **14**, 105-110 (2012).

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138. N. Khalil, V. Garzó and A. Santos, *Hydrodynamic Burnett equations for inelastic Maxwell models for granular gases,* Phys. Rev. E **89**, 052201 (2014).

139. F. Vega Reyes, V. Garzó, and N. Khalil, *Hydrodynamic granular segregation induced by boundary heating and shear*, Phys. Rev. E **89**, 052206 (2014).

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149. V. Garzó and E. Trizac, *Tracer diffusion coefficients in a sheared inelastic Maxwell gas*, J. Stat. Mech. 073206 (2016).

150. R. Gómez González and V. Garzó, *Instabilities in granular gas-solid flows*, J. Phys. A: Math. Theor. **50**, 155502 (2017).

151. V. Garzó, *Shear-rate -dependent transport coefficients in granular suspensions*, Phys. Rev. E **95**, 062906 (2017).

152. H. Hayakawa, S. Satoshi, and V. Garzó, *Kinetic theory of shear tickening for a moderately dense gas-solid suspension: from discontinuous thickening to continuous thickening***,** Phys. Rev. E **96**, 042903 (2017).

153. F. Vega Reyes, A. Lasanta, A. Santos, and V. Garzó, *Energy nonequipartition in gas mixtures of inelastic rough hard spheres. The tracer limit*, Phys. Rev. E **96**, 052901 (2017).

154. N. Khalil and V. Garzó, *Heat flux of driven granular mixtures at low density: Stability analysis of the homogeneous steady state*, Phys. Rev. E **97**, 022902 (2018).

155. V. Garzó, A. Santos, and G. Kremer, *Impact of roughness on the instability of a free-cooling granular gas***,** Phys. Rev. E **97**, 052901 (2018).

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157. R. Gómez González and V. Garzó, *Simple shear flow in granular suspensions: Inelastic Maxwell models and BGK-type kinetic model,* J. Stat. Mech. 013206 (2019).

158. A. Lasanta, F. Vega Reyes, V. Garzó, and A. Santos*, Intruders in disguise: Mimicry effect in granular gases*, Phys. Fluids **31**, 063306 (2019).

159. R. Gómez González and V. Garzó, *Transport coefficients for granular suspensions at moderate densities*, J. Stat. Mech. 093204 (2019).

160. R. Gómez González and V. Garzó, *Influence of the first-order contributions to the partial temperatures on transport properties in polydisperse dense granular mixtures,* Phys. Rev. E **100**, 032904 (2019).

161. R. Gómez González, N. Khalil, and V. Garzó, *Enskog kinetic theory for multicomponent granular suspensions*, Phys. Rev. E **101**, 012904 (2020).

162. R. Gómez González and V. Garzó, *Non-Newtonian rheology in inertial suspensions of inelastic rough hard spheres under simple shear flow*, Phys. Fluids **32**, 073315 (2020).

163. N. Khalil and V. Garzó, *Unified hydrodynamic description for driven and undriven inelastic Maxwell mixtures at low density*, J. Phys. A: Math. Theor. **53**, 355002 (2020).

164. S. Takada, H. Hayakawa, A. Santos, and V. Garzó, *Enskog kinetic theory of rheology for a moderately dense inertial suspension*, Phys. Rev. E **102**, 022907 (2020).

165. R. Brito, R. Soto and V. Garzó, *Energy nonequipartition in a collisional model of a confined quasi-two-dimensional granular mixture*, Phys. Rev. E **102**, 052904 (2020).

166. V. Garzó, R. Brito, and R. Soto, *Navier-Stokes transport coefficients for a model of a confined quasi-two-dimensional granular binary mixture*, Phys. Fluids **33**, 023310 (2021).

167. R. Gómez González, N. Khalil, and V. Garzó, *Mpemba-like effect in driven binary mixtures*, Phys. Fluids **33**, 023310 (2021).

168. V. Garzó, *Comment on "Kinetic theory models for granular mixtures with unequal granular temperature: Hydrodynamic velocity"* [Phys. Fluids **33**, 043321 (2021)], Phys. Fluids **33**, 089101 (2021).

169. R. Gómez González and V. Garzó, *Time-dependent homogeneous states of binary granular suspensions***,** Phys. Fluids **33**, 093315 (2021).

170. R. Gómez González and V. Garzó, *Kinetic theory of granular particles immersed in a molecular gas*, J. Fluid Mech. **943**, A9 (2022).

171. M. García Chamorro, R. Gómez González and V. Garzó, *Kinetic theory of polydisperse granular mixtures: Influence of the partial temperatures on transport properties. A review,* Entropy **24**, 826 (2022) [Featured article in Entropy].

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173. R. Gómez González and V. Garzó, *Enskog kinetic theory of binary granular suspensions: Heat flux and stability analysis of the homogeneous steady states*, Phys. Rev. E **106**, 064902 (2022).

174. C. Sánchez Romero and V. Garzó, *High-degree collisional moments of inelastic Maxwell mixtures. Application to the homogeneous cooling and uniform shear flow states*, Entropy **25**, 222 (2023).

175. M. García Chamorro and V. Garzó, *Assessment of kinetic theories for moderately dense granular binary mixtures: Shear viscosity coefficient,* Phys. Fluids **35**, 027121(2023) [Featured article in Physics of Fluids].

176. V. Garzó, *Towards a better understanding of granular flows*, J. Fluid Mech. **968**, F1 (2023).

177. R. Gómez González and V. Garzó, *Tracer diffusion coefficients in a moderately dense granular suspension. Stability analysis and thermal diffusion segregation*, Phys. Fluids **35**, 083318 (2023).

178. R. Gómez González, E. Abad, S. Bravo Yuste, and V. Garzó, *Diffusion of intruders in granular suspensions: Enskog theory and random walk interpretation*, Phys. Rev. E **108**, 024903 (2023).

179. S. Takada, H. Hayakawa and V. Garzó, *Rheology of a dilute binary mixture of inertial suspension under simple shear flow*, Prog. Theor. Exp. Phys. **113J01**, (2023).

180. R. Gómez González and V. Garzó, *Mobility and diffusion of intruders in granular suspensions. Einstein relation*, J. Stat. Mech. **023211**, (2024).

181. V. Garzó, R. Brito, and R. Soto *Applications of the kinetic theory for a model of a confined quasi-two dimensional granular mixture: Stability analysis and thermal diffusion segregation*, Phys. Fluids **36**, 033326 (2024).

182. R. Gómez González and V. Garzó, *Exact results for non-Newtonian transport properties in sheared granular suspensions: inelastic Maxwell models and BGK-type kinetic model*, Entropy **26**, 265 (2024).

183. R. Gómez González, M. García Chamorro and V. Garzó, *Rheology of granular particles immersed in a molecular gas under uniform shear flow*, Phys. Rev. E **109**, 064901 (2024).

184. S. Bravo Yuste, R. Gómez González, and V. Garzó, *Gaseous diffusion as a correlated random walk*, Phys. Rev. E **110**, 014102 (2024).

185. R. Gómez González , V. Garzó, R. Brito, and R. Soto, *Diffusion of impurities in a moderately dense confined granular gas*, Phys. Fluids **36**, 123387 (2024) [Selected to appear in the AIP Publishing Service].

186. P. Avilés, D. González Méndez and V. Garzó, *Kinetic model for transport in granular mixtures,* Phys. Fluids **37**, 023384 (2025).

Review Articles and Book Chapters

1. V. Garzó and C. Marín, *Nonlinear transport in a dilute binary mixture*, in Recent Research Developments in Physics of Fluids **1**, 45-60 (1998).

2. J. M. Montanero and V. Garzó, *Strong shock waves in a dense gas*, in Recent Research Developments in Fluid Dynamics **3**, 113-123 (2000).

3. J. M. Montanero and V. Garzó, *Nonlinear Couette flow in dilute gases*, in Trends in Statistical Physics **3**, 105-115 (2000).

4. C. Marín and V. Garzó, *Transport of mass and energy in a mixture far from equilibrium*, in Trends in Statistical Physics **3**, 127-136 (2000).

5. V. Garzó, *Kinetic theory for binary granular mixtures at low-density,* Lecture Notes in Physics **753**, Theory and Simulation of Hard-Sphere Fluids and Related Systems (Springer), 493-540 (2008).

6. R. Gómez González and V. Garzó, *Kinetic theory of binary granular suspensions at low density. Thermal diffusion segregation,* Nonequilibrium Thermodynamics and Fluctuation Kinetics (Springer), L. Brenig, N. Brilliantov, and M. Tlidi, Eds., pp. 173-190 (2022).

Conference papers

1. V. Garzó, *Self-diffusion in steady Couette flow,* in Rarefied Gas Dynamics 17, A.E. Beylich ed. (VCH, Weinheim), 207-213 (1991).

2. A. Santos and V. Garzó, *Exact non-linear transport from the Boltzmann equation*, in Rarefied Gas Dynamics 19, J. Harvey and G. Lord, eds. (Oxford University Press, Oxford), 13-22 (1995).

3. V. Garzó and M. López de Haro, *Mutual diffusion tensor of a dilute gas in a thermostatted shear flow state*, in Rarefied Gas Dynamics 19, J. Harvey and G. Lord, eds. (Oxford University Press, Oxford), 50-56 (1995).

4. C. Marín and V. Garzó, *Momentum transport in a dilute binary mixture*, in Rarefied Gas Dynamics 19, J. Harvey and G. Lord, eds. (Oxford University Press, Oxford), 244-249 (1995).

5. M. López de Haro and V. Garzó, *Tracer diffusion far from equilibrium*, in CAM 94 Physics Meeting, A. Zepeda ed. (American Institute of Physics Press, N.Y.), 737-742 (1995).

6. J. M. Montanero, V. Garzó, and A. Santos, *High velocity tail in a dilute gas under shear*, in Rarefied Gas Dynamics 20, C. Shen ed. (Peking University Press, Beijing), 113-117 (1997).

7. C. Marín and V. Garzó, *Kinetic model for momentum transport in a binary mixture*, in Rarefied Gas Dynamics 20, C. Shen ed. (Peking University Press, Beijing), 91-96 (1997).

8. V. Garzó, *Electrical conductivity tensor in a dilute gas under Couette flow*, in Proceedings of the VIII Spanish Meeting on Statistical Physics, FisEs '97, J. A. Cuesta and A. Sánchez, eds. Anales de Física Monografías número 4, 225-226 (1998).

9. C. Marín and V. Garzó, *Mutual diffusion under shear flow*, in Proceedings of the VIII Spanish Meeting on Statistical Physics, FisEs '97, J. A. Cuesta and A. Sánchez, eds. Anales de Física Monografías número 4, 267-268 (1998).

10. M. Tij, V. Garzó, and A. Santos, *Influence of gravity on the thermal conductivity*, in Rarefied Gas Dynamics 21, R. Brun, R. Campargue, R. Gatignol, and J.-C. Lengrand, eds. (Cepadues Editions, Toulouse) 239-246 (1999).

11. J. M. Montanero, A. Santos, and V. Garzó, *DSMC evaluation of the Navier-Stokes shear viscosity of a granular fluid*, AIP Conference Proceedings **762**, 797-802 (2005).

12. V. Garzó, *Impurities in inelastic Maxwell models*, AIP Conference Proceedings, **762** 803-808 (2005).

13. V. Garzó, *Segregation in moderately dense granular binary mixtures* , in The XV International Congress on Rheology, A. Co, L. G. Leal, R. H. Colby, and A. J. Giacomin, eds. (AIP Conference Proceedings **1027**, Melville, NY, 2008), pp. 917—919.

14. F. Vega Reyes, V. Garzó, and A. Santos, *Rheological properties of a granular impurity in the Couette flow* , in The XV International Congress on Rheology, A. Co, L. G. Leal, R. H. Colby, and A. J. Giacomin, eds. (AIP Conference Proceedings **1027**, Melville, NY, 2008), pp. 953—955.

15. L. Almazán, C. Salueña, V. Garzó, J. A. Carrillo, and T. Pöschel, *Hydrodynamics at the Navier-Stokes level applied to fast, transient, supersonic granular flows*, AIP Conference Proceedings, **1051**, 993-1000 (2012).

16. F. Vega Reyes and V. Garzó, *Energy non-equipartition in a system with a granular impurity under Couette-Fourier flow,* AIP Conference Proceedings, 1051, 1017-1023 (2012).

17. M. G. Chamorro, F. Vega Reyes, and V. Garzó, *Homogeneous states in granular fluids driven by thermostats,* AIP Conference Proceedings, **1051**, 1024-1030 (2012).

18. V. Garzó, *Grad's moment method for a low-density granular gas. Navier-Stokes transport coefficients,* AIP Conference Proceedings, **1051**, 1031-1037 (2012).

19. F. Vega Reyes and V. Garzó, *Thermal diffusion segregation of an impurity in a driven granular fluid,* AIP Conference Proceedings **1628**, 04003 (2014).

20. F. Vega Reyes, A. Lasanta, A. Santos, and V. Garzó, *Thermal properties of an impurity immersed in a granular gas of rough hard spheres*, Powders and Grains 2017, EPJ Web Conf. **140**, 04003 (2017).

21. N. Khalil and V. Garzó, *Transport properties from driven inelastic Maxwell mixtures,* AIP Conference Proceedings **2132**, 130004 (2019).

22. R. Gómez González and V. Garzó, *First-order contributions to the partial temperatures in binary granular suspensions at low density*, Springer Proceedings in Physics **252**, 341 (2020).

23. V. Garzó, R. Brito, and R. Soto, *Stability of the homogeneous steady state for a model of a confined quasi-two-dimensional granular fluid***,** Powders and Grains 2021, EPJ Web Conf., Vol. **249**, 04005 (2021).

24. R. Gómez González and V. Garzó, *Non-monotonic Mpemba effect in binary molecular suspensions*, Powders and Grains 2021, EPJ Web Conf., Vol. **249**, 09005 (2021).

Invited Lectures: Academia

1. *Diffusion under shear flow*. Instituto de Investigaciones en Materiales, UNAM, México (May 1991).
2. *Absence of normal solution in far from equilibrium states*. Instituto de Investigaciones en Materiales, UNAM, México (June 1994).
3. *Boltzmann kinetic theory for inelastic Maxwell mixtures*. Department of Chemistry, Kyoto University, Japan (September 2004).
4. *Kinetic Theory of granular mixtures: Thermal diffusion segregation*. Centro de Investigación en Energía, UNAM, México (August 2009).
5. *Non-equlibrium phase transition in a granular binary mixture.* Departamento de Matemáticas, UAB, Barcelona, Spain (January 2011).
6. *Continuum Description of Gas-Solid Flows with LBM-based Drag Model*. Department of Chemical and Biological Engineering, University of Colorado, Boulder (June 2011).
7. *Instabilities in granular fluids at moderate densities.* LPTMS, Université Paris-Sud (May 2015).
8. *Thermal diffusion segregation in granular mixtures.* Departamento de Física, Universidad de Chile, Santiago de Chile (March, 2017).
9. *Segregation in granular mixtures.* G. Millán Institute, Fluid Dynamics, Nanoscience and Industrial Mathematics Department of Materials Science and Engineering and Chemical Engineering, Universidad Carlos III, Madrid (March, 2018).
10. *Granular mixtures at moderate densities. A Kinetic Theory approach*. School of Engineering, University of Warwick, Coventry (June 26, 2019).
11. *Navier-Stokes transport coefficients of gas-solid flows at moderate densities*. Mathematics Institute, University of Warwick, Coventry (June 28, 2019).
12. *Kinetic theory of granular suspensions.* Department of Mechanical Engineering, University of Michigan, Ann Arbor (April 20, 2021) (webinar).
13. *A kinetic theory approach to granular fluids*. Institute for Condensed Matter Physics of the NAS of Ukraine, Lviv (Ukraine) (December 14, 2023) (webinar).

Invited Lectures: Conferences and Workshops (speaker underlined)

1. *An exact solution of the Boltzmann equation for a binary mixture.* **A. Santos** and V. Garzó, Fourth International Workshop on Mathematical Aspects of Fluid and Plasma Dynamics, Kyoto, Japan (October 1991).
2. *Exact non-linear transport from the Boltzmann equation.* **A. Santos** and V. Garzó, 19th International Symposium on Rarefied Gas Dynamics, Oxford, UK (July 1994).
3. *Tracer diffusion far from equilibrium.* **M. López de Haro** and V. Garzó, CAM 94 Physics Meeting, Cancún, México (September 1994).
4. *High-velocity tail in a dilute gas under uniform shear flow.* J.M. Montanero, **V. Garzó** and A. Santos, European Workshop on Kinetic Equations, Granada, Spain (April 1996).
5. *Diffusion in a granular mixture at low density*. **V. Garzó** and J. W. Dufty, CECAM Workshop on Statistical Physics for Dynamic Granular Media, Lyon, France (July 2000).
6. *Shear viscosity of a granular fluid.* J. M. Montanero, V. Garzó, **A. Santos** and J.W. Dufty, CECAM Workshop on Computational Kinetic Theory: Mesoscale Applications, Lyon, France (May 2001).
7. *Rheological properties in a granular mixture.* **V. Garzó** and J.M. Montanero, Euroconference on Asymptotic Methods and applications in Kinetic and Quantum-Kinetic Theory, Granada, Spain (September 2001).
8. *Diffusion in granular shear flows.* **V. Garzó**, CECAM Workshop on Granular Gases: Theory-Experiments-Simulations, Lyon, France (September 2001).

9. *Transport coefficients for granular mixtures at low density.* **V. Garzó** and J. W. Dufty, Florida-Paris Workshop on Granular Fluids, Paris, France (November 2003).
10. *Hydrodynamics for inelastic Maxwell mixtures.* **V. Garzó**, Sixth International Workshop on Mathematical Aspects of Fluid and Plasma Dynamics, Kyoto, Japan (September 2004).
11. *Transport coefficients for a granular gas under simple shear flow.* **V. Garzó**, CECAM Workshop on "From gases to glasses in granular matter: Thermodynamic and hydrodynamic aspects,'' Lyon, France (June 2005).
12. *Navier-Stokes velocity distribution of a granular gas in the heat flux problem.* **A. Santos**, J. M. Montanero and V. Garzó, CECAM Workshop on "From gases to glasses in granular matter: Thermodynamic and hydrodynamic aspects,'' Lyon, France (June 2005).
13. *Shear Flow of Inelastic Maxwell particles.* **A. Santos** and V. Garzó, DuftyFest, Gainesville, Florida (September 2005).
14. *Dense fluid transport for granular mixtures of inelastic hard spheres.* **V. Garzó**, J. W. Dufty, and C. M. Hrenya, Granular Fluids--A Proving Ground for Nonequilibrium Statistical Mechanics, Sevilla, Spain (September 2007).
15. *Segregation by thermal difusión of an intruder in a granular dense gas.* **V. Garzó**, Granular Gas 2008: Beyond the dilute limit, Thurnau, Germany (September 2008).
16. *Kinetic theory of granular gas mixtures.* **V. Garzó**, Temperature in non-equilibrium systems, Barcelona, Spain (September 2008).
17. *Kinetic theory for binary granular gas mixtures: Some applications.* **V. Garzó**, 5th Internacional Workshop on Nonequilibrium Thermodynamics, Cuernavaca, México (August 2009).
18. *Incorporation of Fluid Phase into Hydrodynamic Description of Granular Flows.* **C.M. Hrenya**, V. Garzó, S. Subramaniam, R. Garg, and S. Tennetti, Southern Workshop on Granular Materials SWGM09, Viña del Mar, Chile (November 2009).
19. *Non-equilibrium phase transition in a sheared inelastic granular mixture.* **V. Garzó** and E. Trizac, Fluctuation Phenomena in Interdisciplinary Science, Barcelona, Spain (April 2011).
20. *Non-Newtonian properties in granular Couette flows.* **V. Garzó**, F. Vega Reyes, and A. Santos, Granular and Active Fluids, Zaragoza, Spain (September 2011).
21. *Kinetic theory for granular mixtures at moderate densities: Some applications*, **V. Garzó**, 2^{nD} IMA Conference on Dense Granular Flows, **Keynote Speaker**, Cambridge, UK (July, 2013).
22. *(i) Enskog kinetic theory of monodisperse granular gases; (ii) Enskog kinetic theory for granular mixtures. Some applications; (iii) Transport properties in driven granular mixtures at low-density. Some applications.* **V. Garzó**. Rheology of disordered particle-suspensions, glassy and granular materials, **three Keynote Lectures,** Kyoto, Japan (June, 2018).
23. *On the application of kinetic theory to granular gases.* **V. Garzó.** FisEs'23, Pamplona (25-27, octubre 2023).

Contributed conference presentations (speaker underlined)

1. *Self-diffusion in steady Couette flows.* **V. Garzó**, 17th International Symposium on *Rarefied* Gas Dynamics, Aachen, Germany (July 1990).
2. *Tracer diffusion in shear flows.* **V. Garzó**, FISES'91, Gijón, Spain (October 1991).
3. *Diffusion in far from equilibrium states.* **V. Garzó** and A. Santos, 18th IUPAP International Conference on Statistical Physics, Berlin, Germany (August 1992).
4. *Mutual diffusion tensor of a dilute gas in a thermostatted shear flow state.* **V. Garzó** and M. López de Haro, 19th International Symposium on Rarefied Gas Dynamics, , Oxford, UK (July 1994).
5. *Nonlinear viscosity in a binary mixture at low-density.* **C. Marín** and V. Garzó, FISES'94, Sevilla, Spain (October 1994).
6. *Heat and momentum transport in the ellipsoidal statistical model.* **M. López de Haro** and V. Garzó, European Workshop on Kinetic Equations, Granada, Spain (April 1996).
7. *Non-equilibrium phase transition in a sheared dilute binary mixture.* C. Marín, **V. Garzó** and A. Santos, FISES'96, Zaragoza, Spain (May 1996).

8. *High-velocity tail in a dilute gas under shear.* **A. Santos**, J. M. Montanero, and V. Garzó, 20th International Symposium on Rarefied Gas Dynamics, Beijing, China (August 1996).
9. *Electrical current density in a dilute gas under Couette flow.* **V. Garzó**, First European Symposium on Applied Kinetic Theory, Toulouse, France (May 1998).
10. *Influence of gravity on the thermal conductivity.* M. Tij, V. Garzó and **A. Santos**, 21th International Symposium on Rarefied Gas Dynamics, Marseille, France (July 1998).
11. *Nonlinear transport in a sheared binary mixture.* **C. Marín** and V. Garzó, No Lineal 2000, Almagro, Spain (May 2000).
12. *Diffusion in a sheared granular gas.* **V. Garzó**, FISES'02, Tarragona, Spain (May 2002).
13. *Impurities in inelastic Maxwell models.* **V. Garzó**, 24th International Symposium on Rarefied Gas Dynamics, Bari, Italy (July 2004).
14. *DSMC evaluation of the Navier-Stokes shear viscosity of a granular fluid.* J. M. Montanero, **A. Santos**, and V. Garzó, 24th International Symposium on Rarefied Gas Dynamics, Bari, Italy (July 2004).
15. *Segregation in granular mixtures: Thermal diffusion.* **V. Garzó**, DYGRAM 2006 granular dynamics, jamming, rheology and instabilities, Rennes, France (June 2006).
16. *Segregation in a dense granular gas under gravity.* **V. Garzó**, FISES'08, Salamanca, Spain (March 2008).
17. *Segregation in moderately dense granular binary mixtures.* **V. Garzó**, The XV International Congress on Rheology, Monterey, CA, USA (August 2008).
18. *Energy production rates in fluid mixtures of inelastic rough hard spheres.* **A. Santos**, G. K. Kremer, and V. Garzó, Southern Workshop on Granular Materials SWGM09, Viña del Mar, Chile (November 2009).
19. *What do the inelastic uniform shear flow and the elastic Fourier flow have in common?.* **F. Vega Reyes**, A. Santos, and V. Garzó, Southern Workshop on Granular Materials SWGM09, Viña del Mar, Chile (November 2009).
20. *The role of kinetic transport coefficients in the hydrodynamic simulations of granular flow.* **L. Almazán**, J. A. Carrillo, C. Salueña, V. Garzó and T. Pöschel, 24th International Symposium on Rarefied Gas Dynamics, Zaragoza, Spain (July 2012).
21. *Enery non-equipartition in a granular impurity under Couette-Fourier flow.* **F. Vega Reyes** and V. Garzó, 24th International Symposium on Rarefied Gas Dynamics, Zaragoza, Spain (July 2012).
22. *Diffusion and segregation of a granular impurity in a dense inelastic fluid*, **F. Vega Reyes** and V. Garzó, 2nD IMA Conference on Dense Granular Flows, Cambridge, UK (July, 2013).
23. *Characteristic length and time scales for granular dynamics,* **F. Vega Reyes**, A. Santos, V. Garzó, M. García Chamorro and N. Khalil, Physics of glassy and granular materials, Yukawa Institute, Kyoto, Japan (July 2013).
24. *Molecular dynamics simulations of driven granular mixtures*, **N. Khalil** and V. Garzó, Workshop on Numerical Modelling of Grains/Fluids Flows, ENS Lyon, France (November 2013).
24. *Instabilities in granular fluids at moderate densities*, **V. Garzó**, P. Mitrano and C. Hrenya, International Conference on Statisitcal Physics (SigmaPhi 2014), Rhodes, Greece (July 2014).
25. *Flow instabilities in undriven granular fluids at moderate densities,* **V. Garzó**, P. Mitrano and C. Hrenya, Flowing Matter 2014, Lisbon, Portugal (December 2014).
26. *Non-Newtonian granular suspensions under simple shear low,* **V. Garzó**, M. G. Chamorro and F. Vega Reyes, Flowing Matter 2016, Porto, Portugal (January 2016).
27. *Transport in granular sheared suspensions*, **V. Garzó**, International Conference on Statistical Physics (SigmaPhi 2017), Corfú, Greece (July 2017).
28. *Transport properties of driven inelastic Maxwell mixtures,* **V. Garzó** and N. Khalil, 31st International Symposium on Rarefied Gas Dynamics, Glasgow, UK (July 2018).
29. *Transport coefficients of granular suspensions at moderate densities*, **V. Garzó** and R. Gómez González, 3rD IMA Conference on Dense Granular Flows, Cambridge, UK (July, 2019).

30. *Transport coefficients of granular suspensions at moderate densities*, **R. Gómez González** and V. Garzó, Traffic and Granular Flow 2019, Pamplona, Spain (July, 2019).
31. *Non-monotonic Mpemba effect in binary molecular suspensions*, **R. Gómez González** and V. Garzó, Powders and Grains 2021 (online conference) (July 2021).
32. *Stability of the homogeneous steady state for a model of a confined quasi-two-dimensional granular fluid*, V. Garzó, R. Brito, and **R. Soto**, Powders and Grains 2021 (online conference) (July 2021).
33. *Shear viscosity for granular mixtures: Assessment of kinetic theories,* M. García Chamorro and **V. Garzó**, International Conference on Statistical Physics (SigmaPhi 2023), Creta, Greece (July 2023).
34. *Rheological properties in a sheared granular suspension,* R. Gómez González and **V. Garzó**, 33rd International Symposium on Rarefied Gas Dynamics, Göttingen, Germany (July, 2024).
35. *Rheology of a sheared granular suspension*, R. Gómez González, *,* M. García Chamorro, and **V. Garzó**, 4th IMA Conference on Dense Granular Flows, Cambridge, UK (Juny, 2025).

Graduate (PhD) students supervised

1. José María Montanero Fernández, Ph. D. Physics (June 1996), co-advised with A. Santos.
2. Concepción Marín Porgueres, Ph. D. Physics (February 1997), co-advised with A. Santos.
3. Antonio Astillero Vivas, Ph. D. Physics (June 2007), co-advised with A. Santos.
4. Moisés García Chamorro, Ph. D. Physics (July 2017), co-advised with F. Vega Reyes.
5. Rubén Gómez González, Ph. D. Physics (September 2022).

Postdoctoral Researchers Supervised

Professor Mariano López de Haro (1994-1995)
Dr. Francisco Vega Reyes (2006-2008)
Dr. Nagi Khalil Rodríguez (2013-2014)

Journal reviews

- Physics of Fluids
- Physical Review E
- Physical Review Letters
- Journal of Chemical Physics
- Journal of Physics B
- Journal of Fluid Mechanics
- Physica A
- Transp. Theory and Stat. Phys.
- Nonlinearity
- Phys. Lett. A
- J. Statistical Mechanics
- J. Statistical Physics
- Mathematical Reviews
- Physica Scripta
- Journal of Molecular Liquids

- Journal Non-Newtonian Fluid Mechanics
- European Physics Journal Special Topics
- Información Tecnológica (Chile)
- International Journal of Physical Sciences
- Mathematical Models of Natural Phenomena
- Powder Technology
- Granular Matter
- Europhysics Letters
- New Journal of Physics
- Chemical Engineering Science
- Advances in Condensed Matter Physics
- Journal of Computational Physics
- Chemical Physics
- Results in Physics
- Journal of Physics A: Mathematical and Theoretical
- International Journal of Multiphase Flows
- AIChE

Proposal reviews

- ANEP (Spanish Governement)
- ANECA (Spanish Agency)
- AGAUR (Regional Government of Cataluña)
- ACSUCYL (Regional Government of Castilla y León)
- NOW (Netherlands Organisation for Scientific Research)
- FONDECYT (Chile)
- ANPCT (Argentina)
- FWO (The Research Foundation Flanders)
- UHE (Moscow)
- SNSF (Swiss National Science Foundation)
- NKFI-EPR (Hungary)
- COST (European Cooperation in Science and Technology)
- DFG (Germany Research Foundation)
- ACS Petroleum Research Fund (USA)

Synergistic Activities

- Member of the Board that worked out the book ``Título de Grado en Física'' (ANECA, Spanish agency).
- Member of the Editorial Board of the international journals *Granular Matter*, *Entropy and Frontiers in Soft Matter.*
- University of Extremadura. Vicedean of the Faculty of Sciences (2003-2011).
- Coordinator of ANECA (Spanish Agency) for FPU Grants of the 2012 and 2013 calls in the field "Physics and Space Sciences".