

CV Date
05/03/2024
Part A. PERSONAL INFORMATION

First Name	Andrés		
Family Name	Santos Reyes		
Sex	Male	Date of Birth	06/05/1956
ID number Social Security, Passport	27235927V		
URL Web	https://fisteor.cms.unex.es/investigadores/andres-santos/cv/		
Email Address	andres@unex.es		
Open Researcher and Contributor ID (ORCID)	0000-0002-9564-5180		

A.1. Current position

Job Title	Catedrático de Universidad		
Starting date	1989		
Institution	Universidad de Extremadura		
Department / Centre	Departamento de Física / Facultad de Ciencias		
Country	Spain	Phone Number	(34) 924289540
Keywords	Complex fluids; Fenomenos de no equilibrio [eng]; Transport phenomenon; Fluid dynamics		

A.3. Education

Degree/Master/PhD	University / Country	Year
Programa Oficial de Doctorado en Ciencias Físicas	Universidad de Sevilla	1983
Licenciado en Ciencias Físicas	Universidad de Sevilla	1979

Part B. CV SUMMARY

Number of 6-year research periods ("sexenios"): **6+1** (1979-2020)

Number of Ph.D. theses supervised: **8**

Sum of times cited (up to 05/03/2024): **5,654**

Average citations per year (2014-2023): **224**

Number of WOS-JCR articles in the first quartile (31/12/2023): **173**

h index, WOS (05/03/2024): **36**

Andrés Santos got his BS. degree in June 1978 and his Ph.D. degree in May 1983, both in Physics from the University of Seville and both being recognized with respective "Excellence Prizes". After a post-doc stay in the University of Florida from September 1984 to May 1985, he was appointed Assistant Professor of the University of Seville in October 1985. A few years later, in November 1989, he was promoted to Full Professor of the University of Extremadura (UEX), where he has remained ever since.

Professor Santos has carried out stays for periods between 1 and 11 months in the Universities of Florida, Utrecht, Kyoto, Nacional Autónoma de México, and in the Istituto per i Processi Chimico-Fisici (Messina, Italy), apart from other shorter stays (1-3 weeks) in those universities and other ones (in the Czech Republic, South Korea, Italy, and Brazil).

His research works have essentially focused on three wide fields: kinetic theory of gases, statistical-mechanical theory of liquids, and granular media. Large parts of his research on the first and second fields have been covered, respectively, in two books: Kinetic Theory of Gases in Shear Flows. Nonlinear Transport (Springer, 2003), co-authored with V. Garzó, and A Concise Course on the Theory of Classical Liquids. Basics and Selected Topics (Springer, 2016). As for his research on granular media, one can highlight his paper, in collaboration with J. J. Brey, J. W. Dufty, and C. S. Kim, on "Hydrodynamics for granular flow at low density", which has been cited more than 370 times (February 2024).

As for December 2021, he has authored 290 publications, including 3 books (one of them as editor) and 250 journal articles (168 of them being Q1 in JCR). Moreover, Prof. Santos has acted as a referee for more than 40 different journals (in several of them on a regular basis), has belonged to the Scientific Committee of the FisEs meetings (1999-2003, 2011-2014) and to the International Advisory Committee of the Rarefied Gas Dynamics Symposia (1994-2014), has co-organized an international (2012) and a national (2015) congress, and is a member of the Editorial Board of the journal Entropy.

Professor Santos' work and trajectory has been recognized with a number of awards and honors: Quality Research Prize (shared with V. Garzó) for the book Kinetic Theory of Gases in Shear Flows. Nonlinear Transport (Springer, 2003), University of Extremadura, 2004; Teaching Excellence distinction, University of Extremadura, 2008; Inclusion in the list of APS Outstanding Referees, 2009; Keynote Address in the DSMC09 Conference, 2009; Invited speaker in the 5th Warsaw School of Statistical Physics, Poland, 2013; Inclusion in the Board of Honor of the International Symposia on Rarefied Gas Dynamics, 2014; Excellence Prize to Research Trajectory, University of Extremadura, 2015; corresponding member of the Accademia Peloritana dei Pericolanti (Messina, Italy), 2017; Excellence Prize to Teaching Trajectory, University of Extremadura, 2020.

For an extended version of Prof. Santos' vitae, see

<https://fisteor.cms.unex.es/investigadores/andres-santos/cv/>

Part C. RELEVANT ACCOMPLISHMENTS

C.1. Most important publications in national or international peer-reviewed journals, books and conferences

AC: corresponding author. (n° x / n° y): position / total authors. If applicable, indicate the number of citations

- 1 **Scientific paper.** A. M. Montero; A. Santos. 2023. Structural properties of hard-disk fluids under single-file confinement. J. Chem. Phys.AIP. 159, pp.034503-1-034503-13. ISSN 0021-9606.
- 2 **Scientific paper.** A. Megías; A. Santos; A. Prados. 2022. Thermal versus entropic Mpemba effect in molecular gases with nonlinear drag. Phys. Rev. E. APS. 105, pp.054140-1-054140-24. ISSN 1539-3755.
- 3 **Scientific paper.** A. Lasanta; F. Vega Reyes; A. Prados; A. Santos. 2019. On the emergence of large and complex memory effects in nonequilibrium fluids. New J. Phys.IOP. 21, pp.033042-1-033042-11. ISSN 1367-2630.
- 4 **Scientific paper.** F. Vega Reyes; A. Lasanta; A. Santos; V. Garzó. 2017. Energy nonequpartition in gas mixtures of inelastic rough hard spheres: The tracer limit. Phys. Rev. E. APS. 96, pp.052901-1-052901-9. ISSN 1539-3755.
- 5 **Scientific paper.** A. Lasanta; F. Vega Reyes; A. Prados; A. Santos. 2017. When the Hotter Cools More Quickly: Mpemba Effect in Granular Fluids. Phys. Rev. Lett.APS. 119, pp.148001-1-148001-6. ISSN 0031-9007.
- 6 **Scientific paper.** M. López de Haro; C. F. Tejero; A. Santos; S. B. Yuste; G. Fiumara; F. Saija. 2015. Virial coefficients and demixing in the Asakura-Oosawa model. J. Chem. Phys.AIP. 142, pp.014902-1-014902-8. ISSN 0021-9606.
- 7 **Scientific paper.** A. Santos; J. Piasecki. 2015. Multi-particle critical correlations. Mol. Phys.Taylor & Francis. 113, pp.2855-2862. ISSN 0026-8976.
- 8 **Scientific paper.** A. Santos; M. López de Haro; G. Fiumara; F. Saija. 2015. The effective colloid interaction in the Asakura-Oosawa model. Assessment of non-pairwise terms from the virial expansion. J. Chem. Phys.AIP. 142, pp.224903-1-224903-9. ISSN 0021-9606.
- 9 **Scientific paper.** F. Vega Reyes; A. Santos; G. M. Kremer. 2014. Role of roughness on the hydrodynamic homogeneous base state of inelastic spheres. Phys. Rev. E. APS. 89, pp.020202(R)-1-020202(R)-5. ISSN 1539-3755.
- 10 **Scientific paper.** A. Santos; S. B. Yuste; M. López de Haro; G. Odriozola; V. Ogarko. 2014. Simple effective rule to estimate the jamming packing fraction of polydisperse hard spheres. Phys. Rev. E. APS. 89, pp.040302(R)-1-040302(R)-5. ISSN 1539-3755.

- 11 **Scientific paper.** M. López de Haro; C. F. Tejero; A. Santos. 2013. Communication: Virial coefficients and demixing in highly asymmetric binary additive hard-sphere mixtures. J. Chem. Phys.AIP. 138, pp.161104-1-161104-3. ISSN 0021-9606.
- 12 **Scientific paper.** A. Santos; S. B. Yuste; M. López de Haro; M. Bárcenas; P. Orea. 2013. Structural properties of fluids interacting via piece-wise constant potentials with a hard core. J. Chem. Phys.AIP. 139, pp.074505-1-074505-9. ISSN 0021-9606.
- 13 **Scientific paper.** A. Santos. 2012. Class of consistent fundamental-measure free energies for hard-sphere mixtures. Phys. Rev. E. APS. 85, pp.040102(R)-1-040102(R)-5. ISSN 1539-3755.
- 14 **Scientific paper.** A. Santos; S. B. Yuste; M. López de Haro. 2011. Communication: Inferring the equation of state of a metastable hard-sphere fluid from the equation of state of a hard-sphere mixture at high densities. J. Chem. Phys.AIP. 135, pp.181102-1-181102-4. ISSN 0021-9606.
- 15 **Scientific paper.** F. Vega Reyes; A. Santos; V. Garzó. 2010. Non-Newtonian granular hydrodynamics. What do the inelastic simple shear flow and the elastic Fourier flow have in common?. Phys. Rev. Lett.APS. 104, pp.028001-1-028001-4. ISSN 0031-9007.
- 16 **Scientific paper.** A. Santos. 2008. Does the Chapman-Enskog expansion for sheared granular gases converge?. Phys. Rev. Lett.APS. 100, pp.078003-1-078003-4. ISSN 0031-9007.
- 17 **Scientific paper.** A. Santos; J. W. Dufty. 2006. Dynamics of a hard sphere granular impurity. Phys. Rev. Lett.APS. 97, pp.058001-1-058001-4. ISSN 0031-9007.
- 18 **Scientific paper.** A. Santos; M. López de Haro. 2005. Demixing can occur in binary hard-sphere mixtures with negative non-additivity. Phys. Rev. E. APS. 72, pp.010501(R)-1-010501(R)-4. ISSN 1539-3755.
- 19 **Scientific paper.** A. Santos; V. Garzó; J. W. Dufty. 2004. Inherent rheology of a granular fluid in uniform shear flow. Phys. Rev. E. APS. 69, pp.061303-1-061303-10. ISSN 1063-651X.
- 20 **Scientific paper.** L. Acedo; A. Santos. 2004. The penetrable-sphere fluid in the high-temperature, high-density limit. Phys. Lett. A. Elsevier. 323, pp.427-433. ISSN 0375-9601.
- 21 **Scientific paper.** A. Santos; J. W. Dufty. 2001. Critical behavior of a heavy particle in a granular fluid. Phys. Rev. Lett.APS. 86, pp.4823-4826. ISSN 0031-9007.
- 22 **Scientific paper.** J. M. Montanero; A. Santos. 2000. Computer simulation of uniformly heated granular fluids. Gran. Matt.Springer. 2, pp.53-64. ISSN 1434-5021.
- 23 **Scientific paper.** A. Santos; S. Bravo; M. López de Haro. 1999. Equation of state of a multicomponent d-dimensional hard-sphere fluid. Mol. Phys.Taylor & Francis. 96, pp.1-5. ISSN 0026-8976.
- 24 **Scientific paper.** J. J. Brey; J. W. Dufty; A. Santos. 1999. Kinetic models for granular flow. J. Stat. Phys.Plenum Press. 97, pp.281-322. ISSN 0022-4715.
- 25 **Scientific paper.** J. M. Montanero; V. Garzó; A. Santos; J. J. Brey. 1999. Kinetic theory of simple granular shear flows of smooth hard spheres. J. Fluid Mech.Cambridge UP. 389, pp.391-411. ISSN 0022-1120.
- 26 **Scientific paper.** J. J. Brey; J. W. Dufty; C. S. Kim; A. Santos. 1998. Hydrodynamics for granular flow at low density. Phys. Rev. E. APS. 58, pp.4638-4653. ISSN 1063-651X.
- 27 **Scientific paper.** J. J. Brey; J. W. Dufty; A. Santos. 1997. Dissipative dynamics for hard spheres. J. Stat. Phys.Plenum Press. 87, pp.1051-1066. ISSN 0022-4715.
- 28 **Scientific paper.** M. Lee; J. W. Dufty; J. M. Montanero; A. Santos; J. F. Lutsko. 1996. Long wavelength instability for uniform shear flow. Phys. Rev. Lett.APS. 76, pp.2702-2705. ISSN 0031-9007.
- 29 **Scientific paper.** J. M. Montanero; A. Santos. 1996. Monte Carlo simulation method for the Enskog equation. Phys. Rev. E. APS. 54, pp.438-444. ISSN 1063-651X.
- 30 **Scientific paper.** J. W. Dufty; A. Santos; J. J. Brey. 1996. Practical kinetic model for hard sphere dynamics. Phys. Rev. Lett.APS. 77, pp.1270-1273. ISSN 0031-9007.
- 31 **Scientific paper.** A. Santos; M. López de Haro; S. Bravo Yuste. 1995. An accurate and simple equation of state for hard disks. J. Chem. Phys.AIP. 103, pp.4622-4625. ISSN 0021-9606.

- 32 Scientific paper.** J. J. Brey; A. Santos; V. Garzó. 1993. Analysis of the Evans and Baranyai variational principle in dilute gases. Phys. Rev. Lett. APS. 70, pp.2730-2733. ISSN 0031-9007.
- 33 Scientific paper.** A. Santos; V. Garzó; J. J. Brey; J. W. Dufty. 1993. Singular behavior of shear flow far from equilibrium. Phys. Rev. Lett. APS. 71, pp.3971-3974. ISSN 0031-9007.
- 34 Scientific paper.** S. Bravo Yuste; A. Santos. 1991. Radial distribution function for hard spheres. Phys. Rev. A. APS. 43, pp.5418-5423. ISSN 1050-2947.
- 35 Scientific paper.** A. Santos; J. J. Brey; J. W. Dufty. 1986. Divergence of the Chapman-Enskog expansion. Phys. Rev. Lett. APS. 56, pp.1571-1574. ISSN 0031-9007.
- 36 Scientific book or monograph.** A. Santos. 2016. A Concise Course on the Theory of Classical Liquids. Basics and Selected Topics. Lecture Notes in Physics 923. Springer. pp.1-271. ISBN 978-3-319-29666-1.
- 37 Scientific book or monograph.** V. Garzó; A. Santos. 2003. Kinetic Theory of Gases in Shear Flows. Nonlinear Transport. Fundamental Theories of Physics. Springer. pp.1-364. ISBN 978-1-4020-1436-9.
- 38 Edición científica.** M. Mareschal; A. Santos. 2012. 28th International Symposium on Rarefied Gas Dynamics 2012. AIP Conf. Proc. AIP, Melville. ISBN 978-0-7354-1115-9.

C.3. Research projects and contracts

- 1 Project.** PID2020-112936GB-I00, Sistemas complejos: Una aproximación físico estadística. Ministerio de Economía y Competitividad. Vicente Garzó Puertos. 01/09/2021-31/08/2025. 193.600 €. Team member.
- 2 Project.** IB16087, Desarrollo de algoritmos de procesamiento digital de imágenes y de dinámica molecular para el estudio de fenómenos difusivos en materia granular. Junta de Extremadura. Francisco Vega Reyes. 03/06/2017-02/06/2020. 146.638,8 €. Team member.
- 3 Project.** FIS2013-42840-P, Nuevos retos en las propiedades estáticas y dinámicas de los medios desordenados. Ministerio de Economía y Competitividad. Juan Jesús Ruiz-Lorenzo. 01/01/2014-31/12/2016. 96.800 €.
- 4 Project.** FIS2010-16587, Sistemas complejos: Un enfoque físico estadístico a los medios desordenados y granulares. Ministerio de Ciencia e Innovación. Juan Jesús Ruiz Lorenzo. 01/01/2011-30/06/2014. 141.570 €.
- 5 Project.** SimBioMa, Molecular simulations in biosystems and material science. European Science Foundation (Research Networking Programmes). Berend Smit. 01/05/2006-30/04/2011. 1.010.000 €.
- 6 Project.** FIS2007-60977, Física estadística de sistemas complejos: Medios desordenados y granulares. Secretaría de Estado de Universidades e Investigación – MICINN. Santos Bravo Yuste. 01/10/2007-31/12/2010. 191.785 €.
- 7 Project.** FIS2004-01399, Materia fuera del equilibrio: Medios desordenados y fluidos granulares. Ministerio de Educación y Ciencia. Santos Bravo Yuste. 13/12/2004-12/12/2007. 89.340 €.