

CURRICULUM VITAE
Dimitris Kechrakos
Professor of Computational Physics

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1. EDUCATION

1985-1988 | DPhil in Theoretical Physics, Department of Theoretical Physics, University of Oxford (UK). Thesis title: *Theory of atomic vibrations near crystal interfaces*. Thesis Supervisor: Prof Sir Roger Elliott
https://www2.physics.ox.ac.uk/sites/default/files/2012-11-06/tp_thesis_list_pdf_16880.pdf

1980-1984 | BSc in Physics, National and Kapodistrian University of Athens (NKUoA), School of Sciences, Department of Physics.

2. EMPLOYMENT

2020--- | Professor in *Computational Physics*, ASPETE

2014-2020 | Associate Professor in *Computational Physics*, ASPETE

2009-2014 | Assistant Professor in *Applied Physics*, ASPETE

1996-2009 | Research Associate, Institute of Materials Science, NCSR “Demokritos”, GR

1994-2009 | Assistant Professor (on contract), ASPETE

1993 | External Research Collaborator, Dept. of Physics, University of Thessaloniki, GR

1989-1991 | Research Fellow, Department of Physics, University of Exeter, UK.
 (Group of Prof J. C. Inkson)

3. RESEARCH

• **Overview**

Methods | Green Functions for Empirical Lattice Models;
 Multiple Scattering Theory - Coherent Potential Approximation; Mesoscopic Transport on Lattice Models;
 Monte Carlo methods; Magnetization Dynamics.

Systems | Metallic and Semiconducting heterostructures and nanostructures (nanoparticles, nanowires)

Phenomena | Electron and Heat Transport in Semiconductor Heterostructures;
 Boundary and Disorder Effects in Electronic and Heat Transport;
 Magnetic Ordering in Nanostructures; Superparamagnetism;
 Magnetic Hysteresis Phenomena in Nanostructures;
 Interacting Nanoparticle Assemblies;
 Exchange Coupled Phases and Exchange Bias Effect;
 Spin-polarized transport in Nanoparticle Assemblies;
 Giant / Tunnelling Magnetoresistance in Nanoparticle Assemblies

• **Publications (see Appendix)**

45 publications in refereed journals
 2 book chapters (Editor’s invitation)

• **Dissemination**

41 international conference/workshop participations (3 inv. talks, 15 talks, 23 posters)

12 invited seminars at Universities and Research Institutes

• Conference organization

2010	<i>Second DEMATEN Workshop on “Structural and Functional Characterization of Complex Materials”</i> , June 3-5, 2010, Chalkidiki, Greece. Member of the organizing committee. http://www.tf.uns.ac.rs/dematen/site/index.php/wp5/75-the-second-fp7-workshop
2013	<i>Joint European Magnetism Symposia (JEMS 2013)</i> , 25-30 August 2013, Rhodes, Greece Member of the Local Organizing Committee. http://www.jems2013.org/
2020	<i>Online Workshop on Computational Materials Science</i> , 19-20 December 2020 https://www.materials.uoc.gr/~cms20/

• Citation Record (6 Feb 2019)

	<u>Scopus</u>	<u>Google Scholar</u>
Cites	1148	1790
h-factor	15	18

• Research Projects

Principal Investigator	<ul style="list-style-type: none">• <i>Formation and electrical detection of magnetic skyrmions in cylindrical nanostructures (NANOSKY) (Special Account for Research, ASPETE, Project No 80146, 2018-2020)</i>
Principal Investigator	<ul style="list-style-type: none">• <i>Exchange bias effect in Hybrid Magnetic Nanoparticles with controlled Morphology (ARCHIMEDES-III, 2013-2015)</i>
Member	<ul style="list-style-type: none">• <i>Single- and multiphase ferroics and multiferroics with restricted geometries (SIMUFER) (COST Action MNP0904). Member of the Management Committee.</i> http://www.cost.eu/domains_actions/mpns/Actions/MP0904
Member (on contract)	<ul style="list-style-type: none">• <i>New nanoscale materials for advanced magnetic storage devices (GROWTH G5RD-CT-2001-00478, AMMARE) Inst. Mat. Sciences, NCSR “Demokritos”, GR</i>• <i>X-Rays studies of the structure and electronic properties of magnetic materials (Human Capital & Mobility ERB-HRXT-930135) PI: Dr K N Trohidou, Inst. Mat. Sciences, NCSR “Demokritos”, GR</i>• <i>Photon and Neutron studies of magnetic materials (SCIENCE, 0467-M(SMA)). Inst. Mat. Sciences, NCSR “Demokritos”, GR</i>• <i>Advanced Materials processing and materials structure and properties (STRIDE HELLAS 348) University of Thessalonica, GR</i>• <i>Centre of Excellence in Nanostructured Materials (GSRT, Ministry of Development) Inst. Mater. Sciences, NCSR “Demokritos”, GR</i>• <i>Electronic Structure and Magnetic Properties of Nanostructured Materials. Inst. Mat. Sciences, NCSR “Demokritos”, GR</i>• <i>Computer modeling of nanostructured magnetic materials (NCSR “Demokritos”). Inst. Mat. Sciences, NCSR “Demokritos”, GR</i>• <i>Magnetic Properties of Granular Magnetic Materials (NCSR Demokritos, DEMOEREVNA 1999). Inst. Mat. Sciences, NCSR “Demokritos”, GR</i>• <i>Aggregation Mechanisms for Small Magnetic nanoparticles (PENED 497) Inst. Mat. Sciences, NCSR “Demokritos”, GR</i>

• Grants

1998-1999	State Scholarships Foundation (IKY), Postdoctoral Scholarship (contract Nr 10, Duration: 15 months) for research on “ <i>Magnetic properties of nanoparticle aggregates</i> ”
2000	Royal Society, International Exchange Visitor Grant, for visiting the Department of Theoretical Physics, University of Oxford (1 month).

- **Journal Referee**

<u>Title</u>	<u>Publisher</u>	<u>Period</u>
Journal of Physics : Condensed Matter	IOP	1990-1991 και 2004
Journal of Applied Physics	AIP	1999 -
Semiconductor Science and Technology	IOP	2004 -
Nanotechnology	IOP	2003 -
Materials Research Society Bulletin	APS	2003 -
Physical Review B, E	APS	2004 -
Physical Review Letters	APS	2004 -
Applied Physics Letters	AIP	2008 -
Physica B	Elsevier	2001-
Applied Surface Science	Elsevier	2003-
Journal of Magnetism and Magnetic Materials	Elsevier	2006-

4. TEACHING

- **Courses**

<u>Year</u>	<u>Subject</u>	<u>Level</u>	<u>Institute</u>
2010--	Modern Physics and Technological Applications	Undergraduate	ASPETE
2001-2005	Computational Techniques and Applications http://cgi.di.uoa.gr/~vlsi/odigos/spoudon.htm	Graduate	NCSR "Demokritos" & SAMPS/NTUA, GR
1994-2015	Physics (Young)	Undergraduate	ASPETE
1990-1991	Solid State Physics (Ashcroft & Mermin)	Graduate	Department of Physics, U of Exeter, UK
1989-1991	Physics - Problem classes (Haliday & Resnick)	Undergraduate	Department of Physics, U of Exeter, UK

- **Thesis Supervision**

2016-2019	PhD Thesis of A. Patsopoulos, Department of Physics, NKUoA. Title: <i>Finite-temperature magnetization dynamics of composite nanostructured magnetic materials</i>
2016	MSc Thesis of A. Patsopoulos, Department of Physics, NKUoA. Title: <i>Study of Exchange Bias Effect in bimagnetic nanowires</i>
2009-2015	5 Undergraduate Thesis, ASPETE
2003	MSc Thesis of M. Kolligri, School of Applied Mathematics and Physical Sciences, NTUA. Title: <i>Study of ferromagnetism and superparamagnetism using the Mean Field Theory and Monte Carlo methods</i>

5. ADMINISTRATION

2010-2012	Deputy Head, Department of Sciences, School of Pedagogical and Technological Education (appointed by the School Governing Board)
2015	Member of the Governing Board, School of Pedagogical and Technological Education (appointed by the Minister of Education)

List of publications

1. D. Kechrakos, "The phonon boundary cross section at disordered crystalline interfaces: A simple model", *J. Phys.: Cond. Matter* 2, 2637-2652 (1990)
2. D. Kechrakos and J. C. Inkson, "Phonons at non-planar (III-V) semiconductor heterojunctions : GaAs/AlAs(001)", *Sem. Sci. Tech.*, 5, 818-823 (1990)
3. D. Kechrakos, "The role of interface disorder in the thermal boundary conductivity between two crystals", *J. Phys.: Cond. Matter* 3, 1443-1452 (1991)
4. D. Kechrakos and J. C. Inkson, "Phonons at non-planar (III-V) semiconductor heterojunctions : GaSb/InAs(001)", *Sem. Sci. Tech.*, 6, 155-159 (1991)
5. D. Kechrakos, P. R. Briddon and J. C. Inkson, "Effect of interface disorder on the confined phonon modes of GaAs/AlAs superlattices", *Phys. Rev. B* 44, R9114 (1991)
6. A. Khater, N. Auby and D. Kechrakos, "Surface-to-surface phonon scattering by surface inhomogeneities", *J. Phys.: Cond. Matter* 4, 3743-3752 (1992)
7. S. W. Lovesey, D. Kechrakos and K. N. Trohidou, "An introduction to magnetic photon scattering: Studies of condensed matter", *Z. für Kristal.* 209, 565-571 (1994)
8. D. Kechrakos, K. N. Trohidou and S. Taddei, "Orbital effects in the inelastic magnetic scattering of X-Rays", *Phys. Rev. B* 56 10812-10815 (1997)
9. D. Kechrakos and K. N. Trohidou, "Effects of Dipolar Interactions on the Magnetic Properties of Granular Solids", *J. Magn. Magn. Mater.* 177-181, 943-944 (1998)
10. K. N. Trohidou and D. Kechrakos, "Magnetization behaviour of small particle aggregates", *J. Phys.: Cond. Matter*, 10 L255-258 (1998)
11. D. Kechrakos and K. N. Trohidou, "Magnetic properties of dipolar interacting single-domain particles", *Phys. Rev. B* 58, 12169-12177 (1998)
12. D. Kechrakos and K. N. Trohidou, "Magnetic structure and giant magnetoresistance in granular metals", *J. Appl. Phys.* 87 5179-5181 (2000)
13. D. Kechrakos and K. N. Trohidou, "Interplay of dipolar interactions and grain-size distribution in the giant magnetoresistance of granular metals", *Phys. Rev. B* 62 3941-3951 (2000)
14. Tzavellas, K. N. Trohidou, D. Kechrakos and N. Moutis, "Magnetic behavior of the La_{1-y}Ca_yMn_{1-x}Fe_xO₃ perovskites", *Appl. Phys. Lett.*, 77 3627-3629 (2000)
15. D. Kechrakos, K. N. Trohidou and J. A. Blackman, "Scaling behavior of the giant magnetoresistance of magnetic aggregates", *Phys. Rev. B* 63, 134422 (2001)
16. D. Kechrakos and K. N. Trohidou, "Conditions for optimum giant magnetoresistance in granular metals", *J. Appl. Phys.* 89 7293-7295 (2001)
17. R. Botet, K. N. Trohidou, J. A. Blackman and D. Kechrakos, "Scaling laws in magneto-optical properties of aggregated ferrofluids", *Phys. Rev. E* 64, 031401 (2001)
18. D. Kechrakos and K. N. Trohidou, "Dipolar interaction effects in the spin-dependent transport in nanoparticle systems", *Phys. Stat. Sol. (a)* 189, 277-280 (2002)
19. D. Kechrakos, E. Y. Tsybal, and D. G. Pettifor, "Local Resonant Conductance in Magnetic Tunnel Junctions", *J. Magn. Magn. Mater.* 242-245, 457-460 (2002)
20. D. Kechrakos and K. N. Trohidou, "Spin correlations and electronic transport in magnetic nanoclusters", *Physica B* 318 360-364 (2002)
21. C. Binns, M. J. Maher, Q. A. Pankhurst, D. Kechrakos, and K. N. Trohidou, "Magnetic behavior of nanostructured films assembled from preformed Fe clusters embedded in Ag", *Phys. Rev. B* 66 184413, (2002)
22. D. Kechrakos and K. N. Trohidou, "Magnetic Properties of Self-Assembled Interacting Nanoparticles", *Appl. Phys. Lett.* 81 4574-4576 (2002)
23. D. Kechrakos and K. N. Trohidou, "Competition between dipolar and exchange interparticle interactions in magnetic nanoparticle films", *J. Magn. Magn. Mater.* 262 107-110 (2003)

24. D. Kechrakos and K. N. Trohidou, “Numerical study of the collective magnetic behavior of nanoparticle assembled films”, Appl. Surf. Sci. 226 261-264 (2004)
25. Chado, J.P.Bucher, D. Kechrakos and K. N. Trohidou, “Tuneable magnetic properties of cluster assembled films grown from low temperature co-depositions”, J. Phys. Cond. Matter 16 S2287-S2297 (2004)
26. D. Kechrakos, K. N. Trohidou, J.P.Bucher, and I. Chado “Numerical study of the structure and the magnetic properties of Co clusters on Au surfaces”, Phys. Stat. Sol. (a) 201 (15) 3300- 3304 (2004)
27. J. Bansmann, S.H. Baker, C. Binns, J.A. Blackman, J.-P. Bucher, J. Dorantes-Dávila, V. Dupuis, L. Favre, D. Kechrakos, A. Kleibert, K.-H. Meiwes-Broer, G.M. Pastor, A. Perez, O. Toulemonde, K.N. Trohidou, J. Tuillon and Y. Xie, “Magnetic and structural properties of isolated and assembled clusters”, Surf. Sci. Rep., 56(6-7) 189-275 (2005)
28. D. Kechrakos and K. N. Trohidou, “Correlation between tunneling magnetoresistance and magnetization in dipolar-coupled nanoparticle arrays”, Phys. Rev. B 71(5) 054416 (2005)
29. D. Kechrakos, N. Papanikolaou, K. N. Trohidou, and T. Dietl, “Monte Carlo simulations of ferromagnetism in p-CdMnTe quantum wells”, Phys. Rev. Lett. 94(12) 127201 (2005)
30. D. Kechrakos and K. N. Trohidou, “Monte Carlo Study of The Magnetic Behavior of Self-Assembled Nanoparticles”, J. Magn. Magn. Mater. 295(2) 177-179 (2005)
31. C. Binns, K. N. Trohidou, J. Bansmann, S. H. Baker, J.A. Blackman, J.P. Bucher, D. Kechrakos, A. Kleibert, S. Louch, K.H. Meiwes-Broer, G.M. Pastor, A. Perez, Y. Xie, “The behaviour of nanostructured magnetic materials produced by depositing gas-phase nanoparticles”, J. Phys. D : Appl. Phys. 38(22): 357 (2005)
32. D. Kechrakos and K. N. Trohidou, “Monte Carlo Study of the transverse susceptibility in ordered arrays of magnetic nanoparticles”, Phys. Rev. B 74(14) 144403 (2006)
33. D. Kechrakos, K. N. Trohidou and M. Vasilakaki, “Magnetic properties of dense nanoparticle arrays with core/shell morphology”, J. Magn. Magn. Mater. 316 (2): E291-E294 SEP (2007)
34. D. Kechrakos and K. N. Trohidou, “Dipolar interaction effects in the magnetic and magnetotransport properties of ordered nanoparticle arrays”, J. Nanosci. Nanotechnol. 8 (6) 1-15 (2008)
35. V. Dimitriadis, D. Kechrakos, O. Chubykalo-Fesenko and V. Tsiantos, “Shape-dependent exchange bias effect in magnetic nanoparticles with core-shell morphology”, Phys. Rev. B 92, 064420 (2015)
36. P. Nieves, D. Kechrakos and O. Chubykalo-Fesenko, “Field-dependent energy barriers in Co/CoO core-shell nanoparticles”, Phys. Rev. B 93, 064432 (2016)
37. S. Mitropoulos, V. Tsiantos, K. Ovaliadis, D. Kechrakos and M. Donahue, “Stiff modes in spinvalve simulations with OOMMF”, Physica B 486 169 (2016)
38. V. Alexandrakis, D. Kechrakos, N. Moutis, G. Hadjipanayis, D. Niarchos and I. Panagiotopoulos, “Coercivity and Random Interfacial Exchange Coupling”, J. Appl. Phys. 119 123905 (2016)
39. A. Patsopoulos and D. Kechrakos, “Monte Carlo study of the exchange bias effect in Co/CoO core-shell nanowires”, Nanotechnology, 28, 285701 (2017)
40. A. Patsopoulos and D. Kechrakos, “Exchange bias effect in cylindrical nanowires with ferromagnetic core and polycrystalline antiferromagnetic shell”, J. Magn. Magn. Mater. 465, 678 (2018)
41. A. Patsopoulos and D. Kechrakos, “Magnetic properties of nanowires with ferromagnetic core and antiferromagnetic shell”, J. Magn. Magn. Mater. 475, 171 (2019)
42. F. Nasirpouri, S. -M. Peighambari-Sattari, C. Bran, E.M. Palmero, E. Berganza Eguiarte, M. Vazquez, A. Patsopoulos and D. Kechrakos, “Geometrically designed domain wall trap in tri-segmented nickel magnetic nanowires for spintronics devices”, Scientific Reports, 9(1), 9010 (2019)
43. D. Kechrakos, L. Tzannetou and A. Patsopoulos, “Magnetic skyrmions in cylindrical ferromagnetic nanostructures with chiral interactions”, Phys. Rev. B 102(5), 054439 (2020)

1. D. Kechrakos and K. N. Trohidou, “Magnetic Properties and Magnetotransport in Nanoparticle Assemblies”, *Recent Res. Devel. Physics*, 4 287-307 (2003)
2. D. Kechrakos, “Magnetic Nanoparticle Assemblies”, *Handbook of Nanophysics*, vol. 3. (Ed. K. Sattler), Taylor & Francis (2010) (<http://arxiv.org/abs/0907.4417>)