

PERSONAL INFORMATION

Neculai Plugaru

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Gender Male. | **Date of birth** November 11, 1954. | **Nationality** Romanian.

WORK EXPERIENCE

February 2020 - present

Senior Research Scientist, CS1

National Institute for Research and Development in Microtechnologies (IMT-Bucuresti), 126A, Erou Iancu Nicolae Street, 077190, Bucharest, Romania.

October 2009 - February 2020

Senior Research Scientist, CS1

National Institute of Materials Physics, 405A Atomistilor Str, Magurele, Ilfov, 077125, Romania.

September 2004 – September 2009

Professor

Centro Politécnico Superior (CPS), Universidad de Zaragoza, 50018 Zaragoza, Spain.

Taught course: Electromagnetic fields and waves.(Undergraduate level)

September 2001 – September 2004

Research Fellow

Instituto de Ciencia de Materiales de Aragón (I.C.M.A), C.S.I.C., Zaragoza, Spain.

September 1999 – September 2001

Post doctoral stage

Instituto de Ciencia de Materiales de Aragón (I.C.M.A), C.S.I.C., Zaragoza, Spain.

Grant funded by Ministerio de Ciencia y Tecnología de España y Consejo Superior de Investigaciones Científicas (C.S.I.C), Spain.

November 1983 – September 1999

Physicist ('83-'90), Research Scientist ('90-'94), Research Scientist CS3 ('94-'96), Senior Research Scientist CS2 ('96-'99), Senior Research Scientist CS1 since May 1999

National Institute of Materials Physics, 405A Atomistilor Str., Magurele, Ilfov, 077125, Romania.

September 1980 – October 1983

Physicist

National Institute for Scientific and Technical Research (INCREST), Bucharest, Romania.

RESEARCH ACTIVITY

2000 – present

Current research interests

Modeling materials and interfaces for advanced electronic devices within Density Functional Theory (DFT), DFPT and TD-DFT.

Atomistic design of multiferroic heterostructures integrated with the silicon nanotechnology.

High-Throughput Calculations and Machine Learning for Materials Design and Discovery.

1980 – early 2000s

Previous research activity

Using macroscopic characterization techniques, Fe-57 Mössbauer spectroscopy, neutron diffraction, as well as XMCD and XAS synchrotron techniques, NP brought contributions to the description of complex magnetic phenomena in 4f-3d electron systems, such as: i) Competing exchange mechanisms; ii) exchange and magnetocrystalline anisotropy effects on magnetic structures and magnetic phase diagrams; iii) Effects of chemical, substitutional and/or lattice disorder on the electronic charge and spin densities; iv) Local spin and orbital moments, effect of orbital hybridizations on exchange coupling.

User of Large Facilities

May 2005, Institut Laue-Langevin (ILL), Grenoble, D2B powder diffractometer.

October 2005, Berlin Neutron Scattering Center (BENS), Hahn-Meitner Institute, E9 powder diffractometer.

RESEARCH PROJECTS

2020 – 2023 **IMT-Bucuresti, PN-III-P4-ID-PCE-2020-1985 - COMPFER**

Project title: **Computational design and engineering of functional ferroic interfaces.** Role in the Project: Director

2018 – 2019 **NIMP, PCCF 16**

Project title: **Control of electronic properties in ferroelectric perovskite heterostructures: from theory to applications.** Role in the Project: Collaborator

2013 – 2015 **IMT, ROSA – MATSPACE**

Project title: **Investigation of semiconductor oxide materials performance for space environment applications.** Role in the Project: Collaborator

2012 – 2015 **NIMP, Young researchers teams PN-II-RU-TE-2012-3-0320**

Project title: **Metal-ferroelectric interfaces: From first principles to experimental optimization.** Role in the project: Experienced research scientist

2009 – present **NIMP Core Programs**

2014 **NIMP, EEA Grant: 8SEE/30.06.2014 PERPHECT**

Project title: **Perovskites for Photovoltaic Efficient Conversion Technology.** Role in the Project: Collaborator

2002–2006 **ICMA, IMANA PGE/FEDER, MAT2002/166**

Project title: **Macroscopic and Nanometric Magnets.** Role in the Project: Collaborator

2001–2002 **ICMA, SPring8 (Hyogo, Japan)**

Project title: **Giant 5d orbital magnetic moment of rare-earths.**

Project title: **High-Field XMCD study of induced magnetic compensation in $Nd_2Fe_{14}B$.** Role in the Project: Collaborator

2000 **ICMA, European Synchrotron Radiation Facility (ESRF), (Grenoble, France)**

Project title: **Determination of Eu electronic state in Eu-doped rare-earth intermetallics.** Role in the Project: Collaborator

1999–2002 **ICMA, MAT99/1142, Ministerio de Ciencia y Tecnologia de España**

Project title: **Nuevos Materiales Magnéticos (intermetálicos y moleculares) de interés técnico y básico**. Role in the Project: Collaborator

EDUCATION AND TRAINING

- 1995 **PhD, Thesis Title: Magnetic Properties of Ternary Rare Earth - 3d Transition Metal Compounds**
Babes-Bolyai University, Cluj, Romania.
- 1980 **M.Sc. in Electronic Processes in Condensed Matter Physics**
Faculty of Physics, University of Bucharest, Romania
- 1979 **B.Sc. in Physics**
1975 Faculty of Physics, University of Bucharest, Romania

Participations in Hands-on Workshops

- November 2017 "Spin-orbit effects in molecules and solids: Diversity of properties and computational precision" and the Tutorial "Hands-on FPLO" Dresden, Germany.
- February 2015 CECAM/Psi-k Research Conference: "Frontiers of first-principles simulations: materials design and discovery", Berlin, Germany.
- October 2009 "DFT meets Solid State Chemistry", MPI-CPfS Dresden, Germany.
- August 2008 "DFT meets Experiment and the 7-th Tutorial Hands-on FPLO", Dresden, Germany.
- July 2002 "Electronic Structure of Solids", IFW-Dresden, Germany.
- March 2002 "Hands-on FPLO", IFW-Dresden, Germany.

Short-term research stages

- November 2016 School of Science and Engineering, Reykjavik University, Reykjavik, Iceland.
- October 2015 School of Science and Engineering, Reykjavik University, Reykjavik, Iceland.
- February-March 2012 Laboratory of Chemical Reaction Complex Processes, Research Section, Institute for Advanced Energy, Kyoto, Japan.
- February 1997 Instituto de Ciencia de Materiales de Aragon (ICMA) Zaragoza, Spain.
- June 1994 NATO Advanced Study Institute on Interstitial Alloys, Il Ciocco, Italy.
- September 1994 Laboratory of Magnetism, Institute of Physics of the Chinese Academy of Sciences, Beijing, China.
- June 1990 Laboratoire de Magnétisme, C.N.R.S., Grenoble, France.

PERSONAL SKILLS

Strongly committed to scientific research.
Good communication skills.
Team work.

Mother tongue Romanian

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Español	C2	C2	C2	C2	C2
Français	C1	C1	B2	B2	B1

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
[Common European Framework of Reference for Languages](#)

Computer skills User of open source (linux) quantum codes and processing software.

ADDITIONAL INFORMATION

Fan of Jazz-Rock, Sailing. Water sports

Publications 74 papers

Referee APS, ACS and Elsevier journals

Scientific award 1990, Constantin Miculescu Prize for Physics of the Romanian Academy of Sciences.

Selected Publications

1. *First principles electron transport in magnetoelectric SrRuO₃/BaTiO₃/SrTiO₃/SrRuO₃ interfaces*, N. Filipoiu, N. Plugaru, T. Sandu, R. Plugaru and G.A. Nemnes, Nanotechnology, under review.
2. *Light-Sensing Properties of Amorphous Vanadium Oxide Films Prepared by RF Sputtering* Rodica Plugaru, Iuliana Mihalache, Cosmin Romanişan, Florin Comanescu, Silviu Vulpe, Gabriel Craciun, Neculai Plugaru and Nikolay Djourellov, Sensors 2023, 23(4), 1759;
3. *Parametric FEM simulation of composite barrier FTJs under external bias at room temperature*, Catalin Tibeica, Titus Sandu, Oana Nedelcu, Rodica Plugaru and Neculai Plugaru, Results in Physics, 47, 106350 (2023).
4. *Structure and electrical behavior of silicon nanowires prepared by MACE process*. R. Plugaru, E. Fakhri, C. Romanitan, I. Mihalache, G. Craciun, N. Plugaru, H. Ö. Árnason, M. T. Sultan, G. A. Nemnes, S. Ingvarsson, H. G. Svavarsson and A. Manolescu, Surfaces and Interfaces, 33 (2022) 102167.
5. *Insights into Electron Transport in a Ferroelectric Tunnel Junction*, Titus Sandu, Catalin Tibeica, Rodica Plugaru, Oana Nedelcu and Neculai Plugaru, Nanomaterials 12, 1682 (2022).
6. *New phase transitions driven by soft phonon modes in CsPbBr₃; a DFT study*, Raouia Ben Sadok, Dalila Hammoutene, and Neculai Plugaru, Physica Status Solidi (b), 2000289 (2020). DOI: 10.1002/pssb.202000289
7. *Evolution of microstructure and photoluminescence of ZnO thin films irradiated with 3 MeV alpha particles*, R. Plugaru, I. Gruia, R. Gavrilă, C. Romanitan, I. Mihalache, A. Istrate and N. Plugaru, Surfaces and Interfaces, 20, 100574 (2020).
8. *Effect of chemical nature of atoms on the electronic, dielectric and dynamical properties of ABX₃ halide perovskites*, Raouia Ben Sadok, Neculai Plugaru, Anca Birsan, Victor Kuncser, and Dalila Hammoutène, Int. J. Quantum Chemistry, 120, e26172 (2020).
9. *Designing functional ferroelectric interfaces from first-principles: Dipoles and band bending at oxide heterojunctions*, D. Rusu, L. Filip, L. Pintilie, K. T. Butler and N. Plugaru, New J. Phys. 21, 113005 (2019).
10. *Polarization branches and optimization calculation strategy applied to ABO₃ ferroelectrics*, L. D. Filip, N. Plugaru and L. Pintilie, Modelling and Simulation in Materials Science and Engineering, 27, 045008 (2019).
11. *Atomistic Simulations of Methylammonium Lead Halide Layers on PbTiO₃ (001) Surfaces*, N. Plugaru, G. A. Nemnes, L. Filip, I. Pintilie, L. Pintilie, K. T. Butler, and A. Manolescu, J. Phys. Chem.C, 121, 9096-9109 (2017).
12. *Iodine Migration and Degradation of Perovskite Solar Cells Enhanced by Metallic Electrodes*, C. Besleaga, L. Abramiuc, V. Stancu, A. Tomulescu, M. Sima, L. Trinca, N. Plugaru, L. Pintilie, G. Nemnes, M. Iliescu, H. Svavarsson, A. Manolescu, I. Pintilie, J. Phys. Chem. Lett. 7, pp 5168–5175 (2016).
13. *Assessment of structural, optical and conduction properties of ZnO thin films in the presence of acceptor impurities*, R. Plugaru and N. Plugaru, J. Phys.: Condens. Matter 28, 224008 (2016).
14. *Band alignment and charge transfer in rutile-TiO₂/CH₃NH₃PbI₃ interfaces*, G. A. Nemnes, C. Goehry, T. L. Mitran, Adela Nicolaev, L. Ion, S. Antohe, N. Plugaru and A. Manolescu, Phys.Chem.Chem.Phys., 17, 30417 (2015).
15. *First principles calculations, neutron, and x-ray diffraction investigation of Y₃Ni₁₃B₂, Y₃Co₁₃B₂, and Y₃Ni₁₀Co₃B₂*, N. Plugaru, M. Valeanu, R. Plugaru, and J. Campo, J. Appl. Phys., 115, 023907 (2014).
16. *First principles study and variable range hopping conductivity in disordered Al/Ti/Mn -doped ZnO*, R. Plugaru, T. Sandu and N. Plugaru, Results in Physics 2, pp.190-197 (2012).

Date September, 2024

