



Curriculum Vitae

Dr. Roxana Capu

**Lecturer at Faculty of Physics
West University of Timisoara**

Personal information

Name, Surname:	Roxana Capu		
Date of birth:	04.07.1991	Sex:	F
Nationality:	Romanian		
Researcher unique identifier(s) (ORCID, Researcher ID etc.):	ORCID: 0000-0002-3254-0904 Researcher ID: HPD-5733-2023		
URL for personal website (if case):	https://physics.uvt.ro/facultate/cadre-didactice/capu-roxana/		

Education

Year	Faculty/department - University/institution - Country
2021	Ph.D., Department of Physics, University of Fribourg, Switzerland
2016	Master, Faculty of Physics, "A.I. Cuza" University of Iasi, Romania

Positions - current and previous

(Academic sector/research institutes/industrial sector/public sector/other)

Year	Job title – Employer - Country
2024- present	Lecturer- West University of Timisoara, Romania
2022-2024	Postdoctoral Researcher- West University of Timisoara, Romania

Project management experience

(Academic sector/research institutes/industrial sector/public sector/other. Please list the most relevant.)

Year	Project title - Role – Funder – Budget – link to project webpage
2022-2024	Synthesis and characterisation of high entropy perovskite oxides and their proximity effect with high-Tc superconductors -Project manager- UEFISCDI- 50.000 Euros http://quasar.physics.uvt.ro/~apopescu/HEOHTS/
2022-2024	Study of high entropy oxides- Project manager- West University of Timisoara, 30.000 Euros

Other relevant professional experiences

(e.g. institutional responsibilities, organisation of scientific meetings, membership in academic societies, review boards, advisory boards, committees and major research or innovation collaborations, other commissions of trust in public or private sector)

Year	Description - Role
2022-present	Member of “ Romanian Society of Physics ”
2016-2021	Member of “ Materials with Novel Electronic Properties ”
2019-2020	Member of “ Swiss Physical Society ”
2015-2016	Member of the Council of Faculty of Physics, University of Iasi.
2014-2016	IEEE Magnetic Society and IEEE Student Branch Iași, Romania

C.2 Track record of the last 10 years

1. Subhrangsu Sarkar, Roxana Capu, Yurii Paskevich, Jonas Knobel, Marli R. Cantarino, Abhishek Nag, Davide Betto, Kurt Kummer, Roberto Sant, Christopher W Nicholson, Jarji Khmaladze, Ke-Jin Zhou, Nicholas B. Brooks, Claude Monney, Christian Bernhard, "Composite antiferromagnetic and orbital order with altermagnetic properties at a cuprate/manganite interface", PNAS Nexus, **3**, 1–11 (2024).

<https://doi.org/10.1093/pnasnexus/pgae100>

2. A. Andriesei, D. Plesca, Roxana Capu, R.M. Stan, R. Tanasa, C. Enachescu “Disentangling between static and kinetic effects in the hysteresis of spin crossover molecular magnets”, Romanian Reports in Physics **75**, 502 (2023)

<https://doi.org/10.59277/RomRepPhys.2023.75.502>

3. Roxana Gaina, S. Sarkar, M. Soulier, J. Khmaladze, E. Perret, A. Tcakaev, V. Hinkov, M. Bonura, E. Weschke, and C. Bernhard, “Magnetic-field dependence of the copper charge density wave order in a YBa₂Cu₃O₇/Nd_{0.65}(Ca_{0.7}Sr_{0.3})_{0.35}MnO₃ superlattice”, Physical Review B **104**, 174513 (2021)

<https://doi.org/10.1103/PhysRevB.104.174513>

4. Roxana Gaina, C.W. Nicholson, M. Rumo, S. Sarkar, J. Khmaladze, E. Paris, Y. Tseng, W. Zhang, T.C. Asmara, D. McNally, C. Piamonteze, E. Weschke, T. Schmitt, C. Monney, C. Bernhard, “Long-ranged Cu-based order with dz² orbital character at a YBa₂Cu₃O₇/manganite interface”, npj Quantum Materials **6**, 12 (2021).

<https://www.nature.com/articles/s41535-021-00311-y>

5. S Jenkins, WJ Fan, Roxana Gaina, RW Chantrell, T Klemmer, RFL Evans “Atomistic origin of exchange anisotropy in noncollinear γ -IrMn₃-CoFe bilayers”, Physical Review B **102** (14), 140404 (2020).

<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.102.140404>

6. Andrea Cerreta, Roxana Gaina, Laura Nuccio, Ivan Marozau, Kaushik Sen, Roberto De Andrés Prada, Subhrangsu Sarkar, Christian Bernhard, “Magneto-transport in La_{2/3}Sr_{1/3}MnO₃/YBa₂Cu₃O₇/Alq₃/Co spin-valves”, EPL (Europhysics Letters) **129** (3), 37002, (2020).

<https://iopscience.iop.org/article/10.1209/0295-5075/129/37002>

7. Roberto de Andrés Prada, Roxana Gaina, N Biškup, M Varela, J Stahn, Christian Bernhard, “Controlling the strength of ferromagnetic order in YBa₂Cu₃O₇/La_{2/3}Ca_{1/3}MnO₃ Multilayers”, Physical Review B **100** (11), 115129 (2019).

<https://journals.aps.org/prb/abstract/10.1103/PhysRevB.100.115129>

8. E. Perret, C. Monney, S. Johnston, J. Khmaladze, F. Lyzwa, Roxana Gaina, M. Dantz, J. Pellicciari, C. Piamonteze, B.P.P. Mallett, M. Minola, B. Keimer, T. Schmitt & C. Bernhard “Coupled Cu and Mn charge and orbital orders in $\text{YBa}_2\text{Cu}_3\text{O}_7/\text{Nd}_{0.65}(\text{Ca}_{1-y}\text{Sr}_y)_{0.35}\text{MnO}_3$ multilayers”- Communications Physics **45**, 1 (2018)

<https://www.nature.com/articles/s42005-018-0046-z>

9. Roxana Gaina, Cristian Enachescu, “Nucleation in spin transition molecular magnets: a parallel between Ising-like and Mechanoelastic Models”, Proceedings of the Romanian Academy, Series A, **18**, 3, pp.215-222 (2017)

<https://academiaromana.ro/sectii2002/proceedings/doc2017-3/art04.pdf>

10. R.M. Stan, Roxana Gaina, T. Radu, C. Enăchescu, A. Stancu, R. Bronisz- "Kinetic effects on double hysteresis in spin crossover molecular magnets analyzed with FORC diagram technique " – J.APPL PHYS. **117**, 17B323 (2015)

C.3 Narrative CV

During bachelor and master studies, I benefitted of 3 Erasmus internships as following: University of York, United Kingdom, where I studied theoretically the atomistic origin of exchange anisotropy in IrMn3-CoFe bilayers, University of Fribourg, Switzerland where I studied experimentally the magneto transport properties of a manganite/superconductor/organic material/metal spin valve and University of Manchester, United Kingdom working in the field of electron paramagnetic resonance.

My main research involves the investigation of the proximity effects in manganite/ $\text{YBa}_2\text{Cu}_3\text{O}_7$ (YBCO) and in high entropy oxides/YBCO heterostructures. In my research, I have grown epitaxial heterostructures with Pulsed Laser Deposition (PLD) technique, whereas, I characterized the samples using Rigaku SmartLab 9KW, XRD with a rotating anode and Scanning Electron Microscope (Thermo Fischer SEM FEIXL30SFEG) fitted with EDX system for compositional analysis. The target materials for the PLD were prepared by high temperature solid-state chemical synthesis and was characterized as stated before. The grown samples were examined by Physical Properties Measurement System (PPMS), Vibrating Sample Magnetometer (VSM) and SQUID magnetometer to understand its transport properties. In function of the sample properties that we found; we continue to investigate them with different techniques using X-rays, neutrons, muons etc.

Therefore, we used techniques as Xray Absorption Spectroscopy (XAS) at beamlines from international synchrotrons as Swiss Light Source, Paul Scherrer Institute (CH), European Synchrotron Research Facility (France), Soleil Synchrotron (France), Karlsruhe Institute of Technology (Germany). Because we needed to measure the charge-orbital order induced by the superconductor in the manganite we used techniques like Resonant Elastic and Inelastic Scattering (RIXS & REXS) in Swiss Light Source, European Synchrotron Research Facility, Brookhaven National Laboratory (USA), Diamond Light Source (United Kingdom) and Bessy II Synchrotron from Germany. We involved neutron measurements in order to get the magnetic profile of our thin films while measuring the Polarized Neutron Reflectivity curves in SINQ, Paul Scherrer Institute (CH) or in FRM reactor, Munich, Germany. With Low Energy Muon Spin Rotation, we measured the magnetic transitions in Paul Scherrer Institute (CH).

Through the most important results I mention the observation of a new kind of Cu-based order at a $\text{YBa}_2\text{Cu}_3\text{O}_7$ /manganite interface. This order has an unusually small in-plane wave vector in the range of 0.1 reciprocal lattice units, a large correlation length of 40 nm and an out-of-plane orbital character. Secondly, investigating the inelastic part of each RIXS spectra- with spin flip module, we have information about phonons and magnons and while tracing the magnon dispersion, together with theoretical studies, we discovered a composite antiferromagnetic and orbital order with altermagnetic properties at a cuprate/manganite interface. Altermagnetism is concept newly explained in the end of 2023. Last, but not least, we discovered that the high entropy oxide perovskite material $\text{Nd}(\text{Cr}_{0.2}\text{Mn}_{0.2}\text{Fe}_{0.2}\text{Co}_{0.2}\text{Ni}_{0.2})\text{O}_3$ is a high k dielectric material that has ferroelectric properties. Moreover, with low energy muons we discovered that below a certain temperature the measured thin films becomes entirely ferromagnetic. So we can talk about a magneto-electric coupling.

As teaching duties, I am in charge of „Application of the Plasma in the Medicine and Nanotechnology” course and exercises and laboratories of „Condensed Matter Physics and Semiconductors”.

Note: For each nominated person, please present the CV (uploaded as a single document of maximum 6 pages, saved with the name of the member, A4 format, Times New Roman font, 11-point font size, 1.15 line spacing and 2 cm margins).