

Marta Borysiewicz

Head of Laboratory of Magnetotransport in
Semiconductor Nanostructures

Curriculum Vitae

University of Warsaw
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Academic Background

- 2017 **Habilitation (D.Sc.) in Physics**, Faculty of Physics, University of Warsaw
Thesis: *Electron transport in GaAs-based structures for spintronics*
- 2004 **Ph.D. in Physics (with Honors)**, Faculty of Physics, University of Warsaw
Thesis: *Resonant tunnelling via single impurities in GaAs/AlAs/GaAs heterostructure*
- 1999 **M.Sc. in Physics**, Faculty of Physics, University of Warsaw
Thesis: *Tunnelling in single-barrier AlAs structures*

Professional Experience

- 2006–Present **Assistant Professor (Adiunkt)**, Solid State Physics Division, Institute of Experimental Physics, Faculty of Physics, University of Warsaw
- 2008 **Marie Curie Fellow**, Transfer of Knowledge Program, Montpellier, France
Two-month research stay under the Marie Curie European program.
- 2008 **Visiting Scientist**, High Magnetic Field Laboratory (LNCMI), Grenoble, France
Advanced high magnetic fields measurement sessions.
- 2005 **Research Internship (Post-doc)**, CNRS Laboratory (LPN, currently C2N), Marcoussis, France
One-year research stay focused on nanotechnology and semiconductor physics.

Scientific Interests & Achievements

- Topological States of Matter
 - Study of high crystalline quality topological semimetals, including graphene on SiC (Dirac semimetal), NiTe₂ and TaAs (Dirac and Weyl semimetals, respectively).
 - Study of superconductivity in PbTe/SnTe semiconductor systems (in collaboration with IF PAN) especially superconductivity induced by mechanical strain.
- Altermagnets & AFM
 - Investigation of single crystal bulk MnTe, recently identified as altermagnet. Demonstration of non-zero magnetization and Anomalous Hall Effect in the antiferromagnetic state of the system.
- Quantum Transport & Solotronics
 - Tunneling phenomena in semiconductor heterostructures. Identification of tunnelling via individual impurities in sub-micron mesa structures (diameter < 500 nm) with air-bridge contacts, in collaboration with the CNRS Laboratory for Photonics and Nanostructures (C2N). Demonstration of electron spin conservation during tunneling and role of impurity as a spectrometer of the local density of states.

Magnetism & Spintronics Investigated ferromagnetic semiconductors, including Anomalous Hall Effect (AHE) and tunneling processes in magnetic Esaki diodes. Studies of magnetic anisotropy and Curie temperature in (Ga,Mn)As under hydrostatic pressure to manipulate magnetic states via strain engineering.

Applied Physics Research on transport properties of transparent transition metal oxide layers for applications in touch-screen electrodes.

Selected Publications & Projects

- Publications
- Z. Ogorzałek-Sory et al. "Orthorhombic TaAs – a new topological phase of the archetypical Weyl semimetal", ACS Appl. Mater. Interfaces 17, 51386 (2025), /10.1021/acsami.5c04474
 - K. P. Kluczyk et al. "Coexistence of anomalous Hall effect and weak magnetization in a nominally collinear antiferromagnet MnTe, Phys. Rev. B 110, 15520 (2024), /10.1103/PhysRevB.110.155201
 - M. Gryglas-Borysiewicz et al. "Hydrostatic pressure influence on TC in (Ga,Mn)As", Phys. Rev. B 101, 054413 (2020), 10.1103/PhysRevB.101.054413
 - Z. Ogorzałek et al. "Charge transport in MBE-grown 2H-MoTe₂ bilayers with enhanced stability provided by an AlO_x capping layer", Nanoscale, 2020, 12, 16535, /10.1039/D0NR03148H
- Projects
- 2023: Principal investigator at the University of Warsaw in the NCN project "Thin films of transition metal nanoparticles in a silicon oxide matrix M-Si-O for a new generation of transparent electrodes and contact structures"
 - 2017: investigator in the National Science Centre project "Molecular beam epitaxy growth and investigations of topological semimetal heterostructures with ferro and antiferromagnets"

Teaching Experience

- Courses and Lectures
- Electronic Transport Phenomena - lecture creation and teaching.
 - Introduction to Optics and Solid State Physics, Wave and Vibrations Physics
- Laboratories
- Introductory and advanced experimental laboratories in the condensed matter physics and spintronics.
- Live Experiments
- Demonstrations during Lectures in Mechanics, Wave Physics and Contemporary Physics

Public Science Outreach

- Workshops
- the *Physics Carousel* and the *Summer School of Physics*. Hands-on workshops for elementary schools (since 2022)
- Lectures for kids
- "Electromagnetic Stories" (2022, 2024, 2025, 2026)
 - "Physics in the Kitchen" (2022)

- Science ○ "Electrons against the wall: About tunnelling phenomenon"
- Festival and Public ○ "Superconductivity"
- Public ○ "The Hall Effect in a semiconductor laboratory"
- Lectures ○ "High and low pressures: On pressure in the research laboratory and daily life" (2017)
- "The fascinating world of fluids" (2017)

█ Languages

- Polish Native
- English Professional working proficiency
- French Fluent
- Russian Communicative