

Marek Paściak

Born: 01.12.1980

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Education

- 2004 – 2009 PhD at the Institute of Low Temperature and Structure Research,
Polish Academy of Sciences, Wrocław,
1999 – 2004 MSc at the Faculty of Physics, University of Science and Technology, Cracow.

Research positions and internships

- 2012 – present FZU-Institute of Physics of the Czech Academy of Sciences,
2009 – 2012 Postdoctoral fellowship at the Research School of Chemistry,
Australian National University,
2005 – 2009 International Max Planck Research School “Dynamical Processes in Atoms
Molecules and Solids” in Dresden, Germany,
10.2005-3.2007 Fellowship at the Max Planck Institute for Chemical Physics of Solids, Dresden,
July 2003 Internship at the Institute of Nuclear Physics, Cracow, Poland.

Scientific schools

(2010) Total Scattering Workshop, Melbourne, Australia, (2007) International School on Mathematical and Theoretical Crystallography, Havana, Cuba, (2007) Tutorial „Understanding Molecular Simulations”, Amsterdam, Netherlands, (2006) 1st European School in Material Science, Ljubljana, Slovenia.

Current research interest

- Ferroelectric and relaxor materials: short-range order, anharmonic dynamics, dielectric properties, ferroic domains and domain walls, topological structures, phase transitions,
- Crystallography of partially disordered crystals (diffuse scattering, pair distribution function, including synchrotron and neutron experiments), aperiodic materials,
- Ab-initio and classical modelling of static and dynamic processes in solids, multi-scale simulations.

5 key publications:

- Z. An, H. Yokota, K. Kurihara, ... **M. Paściak**, N. Zhang, Tuning of Polar Domain Boundaries in Nonpolar Perovskite, *Advanced Materials* 2207665 (2023) → Combined experimental and theoretical study showing how polar topological defects within a non-polar medium can be modified by external stimuli.
- Q. Li, V.A. Stoica, **M. Paściak**, ...Hlinka, J., Wen, H., Subterahertz collective dynamics of polar vortices *Nature*, **592**, 376 (2021). → Revealing the nature of subterahertz vibrations in the polar vortex structure with the use of atomistic calculations.
- M. Paściak** et al., *Phys. Rev. B* **99**, 104102 (2019). → Comprehensive analysis of the local structure in a complex relaxor material (Sr,Ba)Nb₂O₆ involving neutron pair distribution analysis and ab-initio molecular dynamics calculations

M. Paściak, T.R. Welberry, J. Kulda, S. Leoni, J. Hlinka. Dynamic Displacement Disorder of Cubic BaTiO₃. Physical Review Letters **120**, 167601 (2018). → Solving of a long-standing problem of dynamical disorder in cubic BaTiO₃ via dynamical analysis of large-scale molecular dynamics simulations and diffuse scattering experiment.

M. Paściak, T.R. Welberry, J. Kulda, M. Kempa, J. Hlinka. Polar nanoregions and diffuse scattering in the relaxor ferroelectric PbMg_{1/3}Nb_{2/3}O₃. Physical Review B **85**, 224109 (2012). → Unveiling of local structure in ferroelectric relaxor perovskites (main ingredients of piezoelectric transducers and actuators).

Publication record

38 publications in impacted journals, ~500 citations, H-factor: 13 (source: Scopus)

International conferences

26 oral contributions including 14 invited. Recent invited talks:

- ISAF-ISIF-PFM, virtual, 2021
- Electronic Materials and Applications, virtual, 2021
- E-MRS Fall Meeting, Warsaw, 2018,
- APS User Meeting, Argonne 2018,
- Dynamical Processes in Solids (DyProSo), Cracow 2017,
- International Union of Crystallography Congress, Hyderabad 2017,