



Curriculum vitae – Dr. Libor Šmejkal



smejkall@fzu.cz
Twitter: @LiborPhysics



Discovered Crystal Hall effect, predicted antiferromagnetic Dirac fermions and relativistic metal-insulator transition

Research and technology interests

Topological antiferromagnetic spintronics, spontaneous and quantum Hall effect; magnetic Dirac phases of matter
Topological magnetic band theory, relativistic quantum mechanics, relativistic spin transport from first principles;
Quantum and low dissipation energy technologies, physics in finance, artificial intelligence and data science

Education

2020	PhD Physics of nanostructures , Charles University, Prague, Czech Republic supervisor: Prof. Tomáš Jungwirth ; co-supervisor: Prof. Jairo Sinova
2014	MSc Condensed Matter Physics <i>with honours</i> (1.00), Masaryk University, Brno, Czech Republic
2013	MSc Theoretical Physics <i>with honours</i> (1.00), Masaryk University, Brno, Czech Republic
2012	Erasmus exchange program , University of Vienna, Vienna, Austria
2011	BSc Physics , Masaryk University, Brno, Czech Republic

Professional appointments

<i>Since 2016</i>	INSPIRE group, Johannes Gutenberg University, Mainz, Germany, <i>Researcher, academic stays</i>
<i>Since 2013</i>	Department of Spintronics and Nanoelectronics, Institute of Physics, Academy of Sciences of the Czech Republic, v. v. i., Prague, <i>PhD candidate</i>
2013, 2014	Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic, <i>external cooperation</i>
2011	Faculty of Science, Department of Physical Electronics, Masaryk University, Brno, Czech Republic, <i>external cooperation</i>
2009-2013	Institute of Physics of Materials, Academy of Sciences of the Czech Republic, v. v. i., Brno, <i>undergraduate research assistant</i>

Selected invited talks

2019, Oct	Antiferromagnetic spintronics – SPICE conference (Mainz, Germany)
2019, Aug	Axion detector developments in Germany and around the world (Göttingen, Germany)
2019, Jul	Workshop on superconductivity and magnetism (Comaruga, Spain)
2019, Jun	Solskymag (San Sebastian, Spain)
2019, Jun	TOPO2019 (Prague, Czechia)
2018, Aug	Physics and Applications of Spin Phenomena in Solids 2018 (Linz, Austria)
2018, Jul	International Conference on Magnetism 2018 (San Francisco, USA)
2017, Oct	Workshop on Antiferromagnetic Spintronics (Grenoble, France)
2017, Oct	Conference on Weyl Fermions in Materials (Trieste, Italy)
2016, Jun	Young researcher leaders conference - SPICE conference (Mainz, Germany)



- 2019 Nov-Dec** Kavli Institute of theoretical physics, CA, USA, research stay in Spin and topology program
- 2019 Oct** Co-organizer of Young researcher leader workshop: Topomagnetism is coming
- 2015-2017** Grant Agency of Charles University, co-investigator, ~27.500 €
Relativistic theory of spin dependent transport in spintronics materials
- Since 2016** Supervision of 10+ visiting physics students and researchers; contribution to several research grants
- 2017-2018** IT4I, computational time at supercomputer, co-investigator

Selected publications



LŠ and T. Jungwirth, Symmetry and topology in antiferromagnetic spintronics, Topology in Magnetism, Eds. J. Zang, V. Cros, A. Hoffmann, *Springer International Publishing* (2018), Chapter in book

LŠ, Yuriy Mokrousov, Binghai Yan, Allan H. MacDonald, Topological antiferromagnetic spintronics, *Nature Physics* **14**, 242–251 (2018), Invited review <https://www.nature.com/collections/wplplmmvnt>, cited >140

S. Yu. Bodnar, LŠ, I. Turek, T. Jungwirth, O. Gomonay, J. Sinova, A.A. Sapozhnik, H.-J. Elmers, M. Kläui, M. Jourdan, Writing and reading antiferromagnetic Mn₂Au: Néel spin-orbit torques and large anisotropic magnetoresistance, *Nature Communications* **9**, 348 (2018), Editors' Highlights <https://www.nature.com/collections/rcdhvxytb>, cited >130

LŠ, J. Železný, J. Sinova, T. Jungwirth, Electric control of Dirac quasiparticles by spin-orbit torque in an antiferromagnet, *Phys. Rev. Lett.* **118** (2017) 106402-106402, cited >60

LŠ, R. González-Hernández, T. Jungwirth, J. Sinova, Crystal time-reversal symmetry breaking and spontaneous Hall effect in collinear antiferromagnets, *arXiv* (2019)

Feng, Z.*, Zhou, X.*, LŠ*, Wu, L., Zhu, Z., Guo, H., González-Hernández, R., Wang, X., Yan, H., Qin, P., Zhang, X., Wu, H., Chen, H., Jiang, C., Coey, M., Sinova, J., Jungwirth, T., and Liu, Z., Observation of the Crystal Hall Effect in a Collinear Antiferromagnet, arXiv:2002.08712 (* contributed equally)

Selected awards

- 2019** Recipient of scholarship for Scientific stay in Germany Ministry of Education, Youth and Sports
- 2018** International conference on magnetism (San Francisco), Student presentation award *finalist*
- 2015** FameLab (Prague) – communication of science competition - *national finalist*
- 2012-2013** Student research scholarships (Masaryk University)
- 2012-2014** Academic scholarships (Masaryk University)
- 2008** Diploma of the Ministry of Education, Youth and Sports of the Czech Republic (Prague)
- 2008** International Young Physicists Tournament (Trogir),
highest points achieved by Czech Republic team within a decade
- 2008** Young Physicists Tournament, national tournament, *winner - leader of Mendel grammar school team*
- 2007** QUANTA (Lucknow) - *4th place in mental abilities quiz*
- 2007** International Young Physicists Tournament (Seoul) – *Czech Republic team*
- 2007** Student Professional Activity in Physics (Prostejov) – *national finalist*
- 2000,2001,2004** Mathematical Olympiad – *winner of regional round*

Languages proficiency

English (C1), German (C1), Czech (native)