

Mariia Potkina, Ph.D.

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🏢 Faculty of Physics, ITMO University, Saint Petersburg, Russia



Scientific Interests

Stability of magnetic nanostructures for spintronic applications.

Employment History

- 2022 – present **Postdoc**, ITMO University.
- 2019 – 2021 **Engineer**, ITMO University.
- Research Engineer**, St. Petersburg State University.
- 2018 **Internship** at the Johannes Guttenberg University, Mainz, Germany.
- 2017 – 2021 **Researcher**, University of Iceland.

Education

- 2017 – 2022 **Ph.D.** University of Iceland, Faculty of Physical Sciences, School of Engineering and Natural Sciences.
Thesis title: *Stability and dynamics of chiral magnetic structures in ferro- and antiferromagnets*. Scientific advisor: H. Jónsson.
- 2017 – 2021 **Ph.D.** Saint Petersburg State University, Department of Statistical Physics.
Thesis title: *Stability of topologically protected magnetic structures for magnetic memory devices*. Scientific advisor: V. M. Uzdin.
- 2015 – 2017 **Master of Physics**. Saint Petersburg State University, Department of Statistical Physics
Thesis title: *Stability and dynamics of magnetic skyrmions*. Scientific advisor: V. M. Uzdin.
- 2011 – 2015 **Bachelor of Physics**. Saint Petersburg State University, Department of Statistical Physics
Thesis title: *Bose condensate profile in 3D traps*. Scientific advisor: M. Yu. Nalimov.

Research Publications




H-index: 8 (according to Google Scholar), 6 (according to WOS).

- 1** Potkina, M. N., Lobanov, I. S., Jónsson, H., & Uzdin, V. M. (2022). Lifetime of skyrmions in discrete systems with infinitesimal lattice constant. *Journal of Magnetism and Magnetic Materials*, 549, 168974, **IF: 2.993**.
- 2** Lobanov, I. S., Potkina, M. N., & Uzdin, V. M. (2021). Stability and lifetimes of magnetic states of nano- and microstructures (brief review). *JETP Letters*, 113, 801–813, **IF: 1.532**.
- 3** Potkina, M. N., Lobanov, I., & Uzdin, V. (2020). Nonmagnetic impurities in skyrmion racetrack memory. *Nanosystems: Physics, Chemistry, Mathematics*, 11, 628–635, **IF: 0.964**.
- 4** Potkina, M. N., Lobanov, I. S., & Uzdin, V. M. (2020). Fine energy structure of a magnetic skyrmion localized on a nonmagnetic impurity in an external magnetic field. *Physics of Complex Systems*, 1, 165–168 **IF: –**.




- 5 Varentcova, A. S., von Malottki, S., **Potkina, M. N.**, Kwiatkowski, G., Heinze, S., & Bessarab, P. F. (2020). Toward room-temperature nanoscale skyrmions in ultrathin films. *npj Computational Materials*, 6, 1–11, **IF: 12.241**.
- 6 **Potkina, M. N.**, Lobanov, I. S., Tretiakov, O. A., Jónsson, H., & Uzdin, V. M. (2020). Stability of long-lived antiskyrmions in the Mn-Pt-Sn tetragonal Heusler material. *Physical Review B*, 102, 134430, **IF: 4.036**.
- 7 Vlasov, S. M., Bessarab, P. F., Lobanov, I. S., **Potkina, M. N.**, Uzdin, V. M., & Jónsson, H. (2020). Magnetic skyrmion annihilation by quantum mechanical tunneling. *New Journal of Physics*, 22, 083013, **IF: 3.732**.
- 8 **Potkina, M. N.**, Lobanov, I. S., Jónsson, H., & Uzdin, V. M. (2020). Skyrmions in antiferromagnets: Thermal stability and the effect of external field and impurities. *Journal of Applied Physics*, 127, 213906, **IF: 2.546**.
- 9 Shustin, M. S., & **Potkina, M. N.** (2020). Effective easy-axis anisotropy of the two-sublattice single-chain magnet with twisted easy planes. *Nanosystems: Physics, Chemistry, Mathematics*, 11, 659–665, **IF: 0.964**.
- 10 Denisov, K. S., Rozhansky, I. V., **Potkina, M. N.**, Lobanov, I. S., Lähderanta, E., & Uzdin, V. M. (2018). Topological Hall effect for electron scattering on nanoscale skyrmions in external magnetic field. *Physical Review B*, 98, 214407, **IF: 4.036**.
- 11 Uzdin, V. M., **Potkina, M. N.**, Lobanov, I. S., Bessarab, P. F., & Jónsson, H. (2018a). The effect of confinement and defects on the thermal stability of skyrmions. *Physica B: Condensed Matter*, 549, 6–9, **IF: 2.436**.
- 12 Uzdin, V. M., **Potkina, M. N.**, Lobanov, I. S., Bessarab, P. F., & Jónsson, H. (2018b). Energy surface and lifetime of magnetic skyrmions. *Journal of Magnetism and Magnetic Materials*, 459, 236–240, **IF: 2.993**.
- 13 Varentsova, A., **Potkina, M. N.**, von Malottki, S., Heinze, S., & Bessarab, P. (2018). Interplay between size and stability of magnetic skyrmions. *Nanosystems: Physics, Chemistry, Mathematics*, 356–363, **IF: 0.964**.
- 14 Lobanov, I., **Potkina, M. N.**, Jónsson, H., & Uzdin, V. (2017). Truncated minimum energy path method for finding first order saddle points. *Nanosystems: Physics, Chemistry, Mathematics*, 586–595, **IF: 0.964**.




Funding Obtained

Coordinator



- 2022 – 2023  RSF 22-72-00059, "Nucleation and mutual transformations of topological magnetic structures".
- 2018 – 2020  Grant of Icelandic Research Fund, 185409-051, 185409-052, 185409-053, "Simulation studies of local magnetic structures in antiferromagnets".
- 2018  Individual grant from German-Russian Interdisciplinary Science Center (G-RISC) for research in Germany, P-2018a-14.

Participant





- 2018 – 2020  RFBR 18-02-00267 A, "Lifetimes of magnetic states of nano- and microstructures".
- 2019 – 2021  RFBR 19-32-90048, "Stability and dynamics of topological spin structures in fer- rimagnetic and antiferromagnetic materials".
- 2020 – 2022  Foundation for the Development of Theoretical Physics and Mathematics "BASIS", 19-1-12-2, "Leader" ("Leading Scientist") "The nature of the topological stability of chiral magnetic and liquid crystal systems".

- 2019 – 2021  RSF 19-42-06302, "Investigation of topological magnetic textures as a basis for artificial neural networks".
-  RSF 19-72-10138, "Energy efficient control of magnetization in nanostructures".
- 2022 – 2023  RSF 22-22-00632, "Physics of three-dimensional chiral topological nano and microsystems".

Skills

- Languages  English (upper intermediate), French (basic).
- Coding  Python, C, \LaTeX

Awards and Achievements

- 2011  Special Scholarship of the Government of St. Petersburg in the field of physics.
- 2011-2012  Scholarship of «Lift to the Future» program.
- 2013  Winner of the «Global Technology Practice» competition for the right to participate in an internship for engineering students in Hamburg, Germany, the «Lift to the Future» program.
- 2018  Diploma for the most cited article in journal "Nanosystems: Physics, Chemistry, Mathematics", <http://nanojournal.ifmo.ru/news/90/>