

**PhD position: Terahertz magnetic recording**  
Supervisor: Rostislav Mikhaylovskiy

The Lancaster University is pleased to offer a PhD studentship supported by Green Future Fellowship project: Terahertz magnetic recording for green data storage technology. The PhD position is available for admission in October 2026. The studentship is fully funded for UK/EU/Overseas students for 4 years. Applicants should have a Master's degree in Physics before the programme starts. The student will be supervised by Dr Rostislav Mikhaylovskiy.

The rapid move to wireless devices and the proliferation of cloud-based technologies call for denser, faster and more energy efficient data processing and storage. However, the heat produced by modern data centres has already become a serious limitation to further increase their performance. At present, the data industry lacks a solution for this problem, which in future may contribute greatly to the global warming and energy crisis. This Fellowship aims to pave a way towards a memory-device characterized by very low energy consumption and switching times of one trillionth of a second. Very short pulses of electro-magnetic radiation at terahertz frequency (i.e. thousand times faster than that in current data communication and processing standards) are among the shortest stimuli available. These pulses are made from light particles, photons, with their energies naturally matching those of elementary quantum magnets, “spins”, which are used to store information in the magnetic memory. Hence, such terahertz photons can selectively excite spins on their own energy scale without releasing any significant heating into the surrounding medium. Furthermore, the terahertz excitation of the spins is expected to be strong enough to induce switching of the spins’ orientations, representing an elementary act of writing a bit of information within a magnetic data storage device.

This predominantly experimental PhD project will explore both fast and efficient control of the magnetic order with an ambition to develop the terahertz magnetic recording with the speed and heat dissipations far beyond the state of the art, laying the fundament for future green computing. This project at the interface between magnetism and photonics offers training in ultrafast optics, terahertz and magneto-optical spectroscopies as well as in physics of magnetically ordered materials. The successful candidate will be trained and supported in other academic skills such as the preparation of high-impact journal publications, and presenting your work at international meetings and conferences. In addition, they will have the opportunity to join in local and national outreach and engagement activities. There will be opportunities for participating in technology transfer and commercialization, international travel, and engagement with major magnetic recording industries such as Seagate Technology. The successful candidate will contribute to solving the existential challenge to the humankind: excessive energy consumption by data-intensive technologies such as Artificial Intelligence, Internet of Things and cloud computing.

The University actively supports equality, diversity and inclusion and encourages applications from all backgrounds and sections of society. The University has a responsibility to ensure that all employees are eligible to live and work in the UK.

**About Green Future Fellowship programme:**

<https://raeng.org.uk/green-future-fellowships>

<https://www.lancaster.ac.uk/physics/about-us/news/green-future-fellowship-for-lancaster-physicist>

**Key publications:**

[1] R. A. Leenders, D. Afanasiev, A. V. Kimel and R. V. Mikhaylovskiy. Canted spin order as a platform for ultrafast conversion of magnons. *Nature* 630, 335 (2024). <https://www.nature.com/articles/s41586-024-07448-3>

[2] S. Schlauderer, C. Lange, S. Baierl, T. Ebnet, C. P. Schmid, D. C. Valocin, A. K. Zvezdin, A. V. Kimel, R. V. Mikhaylovskiy and R. Huber. Temporal and spectral fingerprints of ultrafast all-coherent spin switching. *Nature* 569, 383 (2019). <https://www.nature.com/articles/s41586-019-1174-7>

[3]. S. Baierl, M. Hohenleutner, T. Kampfrath, A. K. Zvezdin, A. V. Kimel, R. Huber, and R. V. Mikhaylovskiy. Nonlinear spin control by terahertz driven anisotropy fields. *Nature Photonics* 10, 715 (2016). <https://www.nature.com/articles/nphoton.2016.181>

**Further info**

If this opportunity interests you, and you'd like to know more—or if you're unsure whether your experience is the right fit—we encourage you to contact the supervisor directly: Dr Rostislav Mikhaylovskiy [r.mikhaylovskiy@lancaster.ac.uk](mailto:r.mikhaylovskiy@lancaster.ac.uk) He will gladly discuss any technical questions about the studentship or the working environment within his research team.