

Physics

Lancaster
University



Ref: 0766-25-R

Job Title: Post-doctoral research associate in ultrafast magnetic switching (TWISST)

Department: Physics

Salary: Grade 6 £33,002 to £37,694

Contract Type: Indefinite with an end date

The Department of Physics at Lancaster University invites applications for a Post-Doctoral Research Associate in the field of ultrafast magnetism and THz-driven spin switching. This is exciting opportunity to work on the extremely timely “TWISST: Terahertz wave induced spin switching technology” project. <https://www.twisst.org.uk/>

TWISST aims to develop the scientific understanding needed to create a new generation of magnetic memory-devices characterised by very low energy consumption and switching times of one trillionth of a second. To achieve this, we will generate an ultrashort light pulse at THz frequencies, strong enough to induce switching of the magnetic order parameter, representing the elementary act of writing a bit of information. As THz photons exactly match the magnetic interaction energy, this represents the optimally energy efficient switching regime, avoiding the localised heating that plagues current energy assisted data storage schemes. We will explore experimentally and theoretically manipulation of magnetic order by the strong THz pulse which can modulate the spin-orbit and exchange interactions, which are responsible for magnetic ordering. We will focus and concentrate intense THz radiation with an antenna onto a magnet, to switch a nanoscale magnetic bit. We will calculate the antenna response and associated magnetic dynamics to inform the antenna design achieving the most efficient coupling between THz phonons and magnetic order.

The position offers access to state-of-the art ultrafast laser facilities and challenging research questions at the interface of photonics and magnetism. The successful candidate will join the world-leading team in ultrafast magnetism and THz photonics. The project is based on the recent breakthroughs:

1. Phys. Rev. Lett. 135, 246703 (2025) <https://doi.org/10.1103/ldnx-67qz>
2. Nature 630, 335–339 (2024) <https://www.nature.com/articles/s41586-024-07448-3>
3. Nature 569, 383–387 (2019) <https://www.nature.com/articles/s41586-019-1174-7>

There will be opportunities for travel and collaborative work with national (University of Manchester) and international (University of Regensburg, Forschungszentrum Jülich, Free University of Berlin) partners.

Successful candidates will hold a PhD in spintronics, magnonics or associated field or in ultrafast spectroscopy and/or THz photonics. Strong theoretical understanding of magnetism is highly desirable.

The post is offered for 24 months at the first instance and is available immediately. Further extension is possible subject to performance and continuous funding. For further information, contact Prof Steven Jamison (s.jamison@lancaster.ac.uk) or Dr Rostislav Mikhaylovskiy (r.mikhaylovskiy@lancaster.ac.uk)

Please apply using <https://hr-jobs.lancs.ac.uk/Vacancy.aspx?ref=0766-25-R>