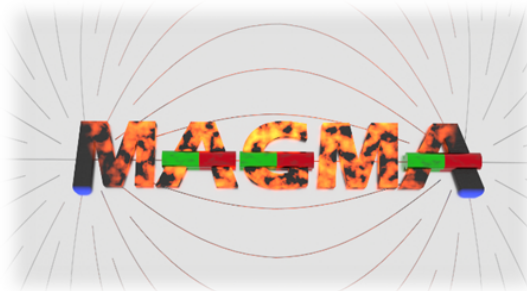


PhD and postdoc projects about magnetic topological insulators

Magnetic topological insulators (MTIs) display a fascinating interplay between magnetic order and topologically nontrivial band structures. In the **MAGMA project** (“Magnetic topological insulators for robust Majorana bound states”), which is funded by the [European QuantERA program](#) and by the national research agencies of Luxembourg, Germany and Spain, we will investigate MTI nanostructures experimentally and theoretically, in particular in the presence of superconductivity induced by the proximity effect. The aim of this project is to engineer Majorana bound states and to **establish MTIs as a platform for topological quantum computation**.



The experimental work will be performed at Forschungszentrum Jülich (FZJ, Germany) and will involve **device fabrication** using electron beam lithography and molecular beam epitaxy, as well as **device characterization** by magnetotransport measurements and scanning probe measurements (in collaboration with Imperial College London, ICL). The theory work will be performed at the University of Luxembourg (UL), the University of the Balearic Islands (UIB, Spain) and FZJ, and will consist in studying **finite-size effects in MTIs** using analytical and numerical methods, as well as **hybrid-device modelling** using complex-band-structure techniques and tight-binding simulations.

We are currently looking for **several PhD students (2 theory, 1 experiment) and postdocs (1 theory, 1 experiment)** for this project. The PhD candidates should have a MSc in physics, ideally with a specialization in condensed-matter physics. The postdoc candidates should have prior experience in project-related research fields, certified by publications and conference contributions. The theory PhD candidates will be in joint supervision between the partner universities and will receive joint PhD degrees.

The review of applications will start immediately, and the positions will remain open until filled. Interested candidates should submit a curriculum vitae, a short statement about their research interests, publications (including Bachelor, Master, or PhD theses if available), copies of all relevant certificates, as well as the contact addresses of possible referees. Candidates should specify their preference for either theory/modelling or experimental projects. Shortlisted candidates will be interviewed remotely or on site and will be invited to give a presentation about a research project of their choice.

For more detailed information about the individual positions, candidates can contact the principal investigators [Thomas Schmidt](#) (UL), [Thomas Schäpers](#) (FZJ), [Peter Schüffelgen](#) (FZJ), [Kristof Moors](#) (FZJ), [Llorenç Serra](#) (UIB), or [Malcolm Connolly](#) (ICL). Applications should be sent to magma@tmqs.lu.