**Thesis Project Offer**

*Joint Research and Education Programme “Palestinian-German Science Bridge PGSB” Forschungszentrum Jülich GmbH & Palestine Academy for Science and Technology*

**Thesis type**

- ☒ BSc  ☒ MSc  ☒ PhD  

- Intended starting date (approx.): As soon as possible

**Contact details of supervisor/responsible host at Forschungszentrum Jülich**

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**Function*  
Staff Scientist

**Institute and homepage of institute**  
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**University affiliation in Germany**  
RWTH Aachen (via Prof. Dr. Thomas Brückel)

**Co-Supervisor at Palestinian university (if applicable)**

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**Project description**

**Investigation of superconductor/ferromagnet thin film heterostructures with in-plane texture**

The antagonist electron spin orders in ferromagnetism and in spin-singlet Cooper pairs mediated superconductivity hamper the application of superconductor/ferromagnet (S/F) thin film heterostructures in low power dissipation spintronics. However, at carefully engineered S/F interfaces, equal-spin-triplet Cooper pairs can be generated. This can be the case when the ferromagnet shows an in-plane magnetic texture like domains.

The proposed study aims at investigating, as a function of temperature and applied magnetic field, the depth and in-plane profiles of superconducting and ferromagnetic orders in an epitaxial thin film heterostructure of a high-Tc superconductor and a ferromagnet with in-plane texture. The chosen system will be produced by a combination of high oxygen pressure sputtering and ultra-high vacuum molecular beam epitaxy. The samples will be investigated at the laboratory (X-ray diffraction, resistivity, magnetometry, magnetic force microscopy) and using advanced neutron scattering methods at worldwide unique instruments of the Heinz Maier-Leibnitz Zentrum (MLZ) in Garching close to Munich.

**Date**  
23.03.2020

* required field