**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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**University affiliation in Germany**

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

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**Phone** E-mail


**University/institution** Department/faculty/institute


**Project description**

**Electrical field control of nanoscale magnetic textures**

Spintronics is a field of electronics in which not only the charge but also the spin of the electron is used for information storage, transport and processing. Spintronics systems are currently operated by electrical current actuation which requires much larger energy consumption than electrical field actuation used in usual electric circuits. Electrical field actuation of magnetic properties has therefore become an intense field of research in the last years. Ferroelectrics interfaced with thin film magnetic materials have already shown to allow control of magnetic properties near the interface via ferroelectric polarization.

The proposed study aims at investigating, as a function of applied electrical field, not only the depth profile of magnetic order in ferroelectric/ferromagnetic thin film heterostructures but also the in-plane nanoscale electric and magnetic textures that can be present in such systems.

The chosen ferroelectric/ferromagnetic thin film heterostructure will be produced using state-of-the-art molecular beam epitaxy. Electrical field dependent structural and magnetic investigations will be performed at the laboratory (X-ray diffraction, magnetometry, magnetic force microscopy), and at worldwide unique neutron scattering instruments of the Heinz Maier-Leibnitz Zentrum (MLZ) in Garching close to Munich.

**Date** Signature

20.03.2020

* required field