

2017 Helmholtz – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

PART A

Title of the project: Ultrafast Spin and Electron Dynamics in Complex Magnets

Helmholtz Centre and Institute:

Forschungszentrum Jülich, Peter Grünberg Institut - Electronic Properties (PGI-6)

Project leader: Prof. Claus M. Schneider, Prof. Markus Büscher

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Description of the project:

The Jülich Short-pulse Particle Acceleration and Radiation Center (*JuSPARC*), that is currently being set-up at the Forschungszentrum Jülich, will enable world-class research with ultrashort (femtosecond) high-energy photon pulses. It will provide novel means to investigate and understand ultrafast and non-linear phenomena in condensed matter, material, information science and energy research.

At the heart of *JuSPARC* several fs-pulse lasers with highest possible repetition rates are driving upconversion units for the efficient production of photon pulses with a wide range of photon energies from the visible to hard X-rays. This enables a large variety of spectroscopy, microscopy and scattering experiments with the aim to address the complex interplay of structural, spin, and electron dynamics in condensed matter systems. The optimum use of *JuSPARC* is also closely linked to the development of novel experimental approaches and instruments. One of these novel techniques is time- and spin-resolved electron momentum microscopy on the basis of femtosecond pump-probe procedures.

The proposed project aims at a fundamental understanding of the ultrafast spin dynamics in complex magnetic systems, and its intimate relationship to details of the electronic band structure. The studies will encompass selected magnetic alloys and thin film stacks, which will be investigated by time- and spin-resolved electron momentum microscopy.

Description of existing or sought Chinese collaboration partner institute:

In the field of condensed matter physics there are several contacts from the past with the physics department of Fudan University in Shanghai. Fudan is particularly strong in electronic

aspects of complex solid state systems, superconductivity and magnetism in both experiment and theory. Several internationally well established groups are working in thin film magnetism, spin structures, or electronic structure characterization. A MoU for establishing collaborative activities between Jülich and Fudan University was signed in 2015. The expertise of the Fudan Physics Department in solid state physics complements that of the Peter Grünberg Institute.

Supplementary, we welcome collaboration with any Chinese institution that deals with the same subjects and shares our scientific interests.

Required qualification of the post-doc:

- PhD in experimental condensed matter physics
- Experience with electron spectroscopies and surface physics
- Additional skills in magnetism are desired

PART B

Documents to be provided by the post-doc:

- Detailed description of the interest in joining the project (motivation letter)
- Curriculum vitae, copies of degrees
- List of publications
- 2 letters of recommendation

PART C

Additional requirements to be fulfilled by the post-doc:

- Max. age of 35 years
- PhD degree not older than 5 years
- Very good command of the English language
- Strong ability to work independently and in a team