2 years Postdoc position:
"Time resolved soft X-ray resonant magnetic scattering to study depth-resolved magnetization dynamics."

Scientific context and objectives:

The ultrafast femtomagnetism research field has been pioneered by French researchers from IPCMS in Strasbourg, showing that femtosecond optical pulses interacting with ferromagnetic material results in a sub-picosecond quenching of the magnetization [1]. However, in spite of intensive experimental and theoretical works, the microscopic mechanisms driving the ultrafast demagnetization process are still hotly debated [2-8]. Key advances directly relay on new experimental studies aiming to lift actual controversies in this field of research.
The goal of this postdoc project is to set up a new X-ray based instrumentation to address specific questions concerning the mechanisms at work during the ultrafast demagnetization. Our ambition is to take full advantage of the element selectivity, time and spatial resolution of X-ray Resonant Magnetic Scattering and Reflectivity (tr-XRMS or tr-XRMR) to study the dynamics in ferrimagnetic materials. Providing a combined time, element and depth-resolved description of structure and spins in ferrimagnetic materials will be of great benefit to describe ultrafast demagnetization mechanisms. In this context tr-XRMR(S) will provide unique opportunities.

Work context and missions:

This position is founded for 2 years by the French ANR (Agence National de la Recherche) and will take place in collaboration between, the LCPMR (Laboratoire Chimie Physique Matière et Rayonnement, CNRS-Sorbonne Université in Paris) team “systèmes fortement corrélés – Matériaux magnétiques”) and the CNRS- IPCMS team “dynamic processes” at University Strasbourg. The PostDoc will be located at CNRS-IPCMS Strasbourg, but will travel to Paris to (i) develop and perform experiments at SEXTANTS beamline of SOLEIL and to (ii) gain expertise in magnetic reflectivity analysis within the LCPMR team.
Her/his mission will be to set up and characterize the advanced pump-probe technique at the SEXTANTS beamline. She/he will employ the TR- XRMR(S) to describe depth modulations of the magnetization profiles. She/he will benefit from the expertise of the two hosting laboratories: (i) IPCMS in Strasbourg for rare-earth/transition-metal sample related challenges and (ii) LCPMR in Paris for magnetic reflectivity set up and analysis.
The postdoc will conduct collaborative work within the two hosting team at IPCMS with Christine Boeglin and Nicolas Bergeard and at LCPMR with Emmanuelle Jal and Boris Vodungbo, by growing and characterizing samples, and analyzing data recorded at the SOLEIL French synchrotron. She/he will take part of the construction and testing of the pump-probe set up development interacting with Nicolas Jaouen, the beam line scientist in charge of SEXTANTS beam line. Finally, she/he will be implied in experiments performed at Free Electron Laser facilities such as FERMI and the European XFEL in Hamburg.

Skills and application:

Candidates should hold a PhD degree in physics or a related discipline. A strong expertise in magnetism and/or time-resolved condensed matter experiments and/or synchrotron experiments would be helpful. A demonstrated track record of performing excellent research within collaborative projects with autonomy and enthusiasm is equally important as well as

strong written and verbal communication's skills. Candidates should contact Christine Boeglin and Emmanuelle Jal by submitting their CV, a letter of motivation and the name of up to three established researchers willing to provide a letter of recommendation.
Christine.Boeglin@ipcms.unistra.fr and Emmanuelle.jal@sorbonne-universite.fr
(http://www.ipcms.unistra.fr/?page_id=8433&lang=en) and (https://lcpmr.cnrs.fr/content/emmanuelle-jal)

Details:

- 2 years contract based in Strasbourg with 2000-2500 euros net/month salary depending on the experience.
- Because of COVID, flexible start between April 2021 and Oct 2021.
- Health, pension and unemployment securities are provided.
- Application deadline: April 1, 2021

[1] Beaurepaire et al. Phys. Rev. Lett. 76, 4250 (1996)
[2] Stanciu et al. Phys. Rev. Lett. 99, 047601 (2007)
[3] Boeglin et al. Nature 465, 458 (2010)
[4] Battiato et al. Phys. Rev. B 86, 024404 (2012)
[5] Bergeard et al. Nature Communications 5, 3466 (2014)
[6] Ferté et al. Phys. Rev. B 96, 134303 (2017)
[7] Ferté et al. JMMM, 485, 320 - 324, (2019)
[8] Jal et al. Phys. Rev. B 95, 184422 (2017)