Towards Ultrafast and Nanoscale control of Exchange (TUNE)

Initiative: Forschung mit Freie-Elektronen-Lasern: Peter Paul Ewald-Fellowships am LCLS in Stanford

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Magnetism has greatly contributed to humanity's progress by providing key technologies, beginning with the invention of the navigational compass made of lodestones around the 10th century in China. Nowadays, from electrical motors, motion sensors to data storage, magnets are everywhere in our lives. Exchange interaction is the strongest force in magnetism. It is responsible for the spin ordering in magnetic materials and has recently attracted great attention from researchers around the world. Indeed, recent experiments are suggesting that excitation with femtosecond laser pulses could harness this force in specifically designed magnetic heterostructures. Using the combined femtosecond and nanometer resolution of X-ray free-electron lasers (FELs) investigations of these phenomena become feasible. The planned experiments at FELs have the potential to settle a highly controversial discussion. The proposed research tackles key questions at the frontier of today's physics of magnetism, with potential direct technological applications for magnetic data storage.

Projektbeteiligte

Dr. Loic Le Guyader
European XFEL
Spectroscopy & Coherent Scattering
Hamburg

Prof. Dr. Hermann Dürr
SLAC National Accelerator Laboratory
Stanford Institute for Materials & Energy Sciences
(SIMES)
Menlo Park
USA

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Stacking order dynamics in the quasi-two-dimensional dichalcogenide 1T -TaS 2 probed with MeV ultrafast electron diffraction