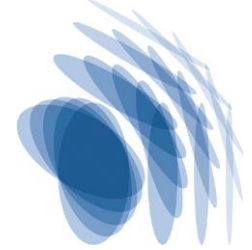


Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter



IMPRS UFAST Call for PhD applications 2025/2026



JW1 –Development and testing of strategies for GHz-XPCS experiments at European XFEL

Title of PhD Project	Development and testing of strategies for GHz-XPCS experiments at European XFEL
Type	Experimental (methods development, in particular data analysis)
Supervisor(s)	James J. Wrigley, Johannes Moeller, Luca Gelisio (European XFEL) Anders Madsen (Sakura Pascarelli) (IMPRS, European XFEL) Christian Gutt (University of Siegen, Germany)
Affiliation(s):	European XFEL
Number of positions:	1
Abstract:	<p>Mega-Hertz X-ray Photon Correlation Spectroscopy (MHz-XPCS) is an established technique at the European XFEL's MID scientific instrument, which is successfully used in many user experiments to investigate biological and colloidal samples on microsecond timescale. However, many scientific questions, from atomic and molecular liquids to biological and colloidal samples, require probing the dynamics on shorter timescales. Currently, we cannot access these processes, due to the inherent shortest time resolution of 220 ns, given by the 4.5 MHz repetition rates of European XFEL and of the AGIPD detector.</p> <p>The current development of <i>twin bunch</i> operation at SASE2 opens up exciting new opportunities for accessing faster dynamics via Giga-Hertz (GHz) XPCS. The full exploration of these new technological capabilities needs to be accompanied by simultaneous developments in data analysis capabilities.</p> <p>Here, we propose a PhD project in which the corresponding data pipeline and analysis strategies for GHz-XPCS will be developed and consecutively tested with experimental data sets using different detector technologies, which will enable assessing quasi-real-time inspection of dynamic processes captured via GHz-XPCS.</p> <p>The PhD candidate will be embedded in the <i>Data Analysis</i> and <i>MID</i> groups at European XFEL, as well as in the <i>X-ray science</i> group at the University of Siegen.</p>
Contact person for scientific questions about the project:	James J. Wrigley: james.wrigley@xfel.eu
Research Group Website:	https://www.xfel.eu/data_analysis/ https://www.xfel.eu/facility/instruments/mid/ https://www.physik.uni-siegen.de/x-ray/

