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 2024/2025





FG1 - Laser-Streaking for Novel Time-of-Arrival Measurements of X-ray Photons and lons

Title of PhD Project	Laser-Streaking for Novel Time-of-Arrival Measurements of X-ray Photons
	and lons
Туре	Experimental
Supervisor(s)	Prof. Dr. Florian Grüner
	Prof. Markus Drescher (co supervisor)
Affiliation(s):	UHH
Number of positions:	1 PhD
Abstract:	 The concept of laser streaking of charged particles opens new applications in various fields ranging from biomedical X-ray imaging even up to new ways in gravitational wave detection. For the first case, the time of arrival of X-ray photons needs to be measured with sub-picosecond precision, while the latter case needs a sub-femtosecond resolution for ions. In principle, for both applications, the laser streaking is applied to the induced photo-electrons, therefore the two envisaged use cases can be studied together. Structure of the PhD project: The streaking concept for medical imaging has already been worked out by help of simulations. A first demonstration experiment has also been planned already and needs to be set up in our laser lab. The next step is then the scaling-up of the energy of the incident photons and the corresponding photo-electrons' kinetic energies towards those levels relevant in biomedical imaging. For the second use case, i.e. the streaking of an ion, a new conceptual design needs to be worked out for developing a proof-of-concept experiment in our lab. The ions will be streaked indirectly via their induced photo-electrons.
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scientific questions about	
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