



IMPRS UFAST Call for PhD applications 2022/2023



FK1- Terahertz Generation and Acceleration

Title of PhD Project	Terahertz Generation and Acceleration
Type	Experimental
Supervisor(s)	Prof. Franz X. Kärtner
Affiliation(s):	DESY
Number of positions:	1
Abstract:	<p>We are developing high energy Terahertz (THz) sources with milli-Joule energies based on cascaded optical rectification of high energy optical laser pulses. In this project, we will both scale up the energy of these sources to tenth of milli-Joule and use those pulses to generate, accelerate and manipulate ultra-low emittance electron bunches up to relativistic energies. The generated electron bunches are used in compact ultrafast X-ray sources as well as for ultrafast electron diffraction and microscopy. Jointly with collaborators the generated ultrafast X-ray and electron pulses will be applied to the study of biochemical processes and quantum materials. We seek candidates with a background/experience in at least one of the following fields ultrafast and/or nonlinear optics, laser physics, accelerator physics, beam physics, vacuum technology, programming/numerical skills (Matlab, C++, LabView) are highly advantageous. The successful candidate should be highly motivated and will work in a team with PhD students and other postdocs in a first-class scientific environment on cutting-edge topics at the current frontiers of ultrafast science. Research is performed within international collaborations, with groups at MIT, Arizona State University, and Uppsala University.</p> <p>D. Zhang et al., "Segmented THz electron accelerator and manipulator (STEAM)," Nat. Photonics 12: (6) 336 (2018).</p> <p>S. W. Jolly et al., "Spectral phase control of interfering chirped pulses for high-energy narrowband terahertz generation," Nature Communications 10, pp. 872-877 (2019).</p> <p>D. Zhang, et al., "THz-Enhanced DC Ultrafast Electron Diffractometer," Ultrafast Science (2021); DOI: 10.34133/2021/9848526</p>
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