



IMPRS UFAST Call for PhD applications 2020/2021



Terahertz based ultrafast, ultralow emittance electron guns

F. Kärtner-2

Title of PhD Project	Terahertz based ultrafast, ultralow emittance electron guns
Type	Experimental
Supervisor(s)	Prof. Franz X. Kärtner Dr. Nicholas Matlis
Affiliation(s):	DESY
Number of positions:	1
Abstract:	<p>We are developing high energy single-cycle and multi-cycle Terahertz (THz) sources with milli-Joule energies based on optical rectification of high energy optical laser pulses. In this project we will use those pulse to to accelerate and manipulate ultra-low emittance electron bunches up to relativistic energies. The generated electron bunches will be used for demonstrating compact ultrafast X-ray sources as well as for ultrafast electron diffraction (UED). In collaboration with other groups, the generated ultrafast X-ray and electron pulses will be applied to the study of biochemical processes and quantum materials.</p> <p>We seek candidates with strong background/experience in THz generation, ultrafast nonlinear optics, accelerator physics, beam physics, high-vacuum technology, programming/numerical skills (Matlab, C++, LabView) are highly advantageous. The successful candidate should be self-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>
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