



IMPRS UFAST Call for PhD applications 2023/2024

TH1 & FK2-Designing novel nano-photonic ultrafast sources



Title of PhD Project	Designing novel nano-photonic ultrafast sources
Type	Experimental
Supervisor(s)	Prof. Tobias Herr, Prof. Franz Kärtner
Affiliation(s):	DESY
Number of positions:	1
Abstract:	<p>Femtosecond laser sources provide access to ultrafast timescales and represent a cornerstone of experimental ultrafast science. In our group we pursue ultrafast sources based on nonlinear microresonators that are implemented on the micrometer-scale on photonic chips. These sources can provide few-cycle pulses with record-high pulse repetition rate reaching THz frequencies. Recently, we found that nano-structuring of the resonators can unlock rich and unexplored nonlinear optical phenomena and new functionality of microresonator sources. The aim of the project is to explore these phenomena and to create the next generation of microresonator sources for applications ranging from precision cosmology to boosting the capacity and energy efficiency of computing and data centers.</p> <p>The thesis will leverage experimental, numerical, and analytical techniques at the forefront of integrated photonic technology, ultrafast lasers and nonlinear optics. It includes the design of advanced chip-integrated laser systems as well as experiments in our state-of-the-art laboratory (https://ump.cfel.de/). It combines exploration of unknown physics with the development of immediately relevant and meaningful optical technologies. We present our work frequently at international conferences and work closely with other research groups across scientific disciplines.</p> <p>References: Herr et al., Nature Photonics 8, 145 (2014) Brasch et al., Science 351, 6271 (2016) Obrzud et al., Nature Photonics 13, 31 (2019) Wildi et al., Optica 10, 6, 650 (2023) Ulanov et al., https://arxiv.org/abs/2301.13132 (2023)</p>
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