



## IMPRS UFAST Call for PhD applications 2020/2021

### Laser-induced electron diffraction of chemical dynamics

J. Küpper-1



<b>Title of PhD Project</b>	<b>Laser-induced electron diffraction of chemical dynamics</b>
<b>Type</b>	Experimental
<b>Supervisor(s)</b>	Prof. Jochen Küpper
<b>Affiliation(s):</b>	Center for Free-Electron Laser Science (CFEL), Deutsches Elektronen-Synchrotron DESY & Universität Hamburg
<b>Number of positions:</b>	1
<b>Abstract:</b>	<p>We are exploring the applicability of laser-induced electron diffraction (LIED) to complex molecular systems and to unravel their chemical dynamics in order to fully disentangle the dynamic atomic nature of chemistry. We have already unraveled the influence of the molecular frame onto the strong-field-ionization and rescattering process underlying LIED and have developed theoretical approaches to describe these processes. Furthermore, we have demonstrated unprecedented degrees of field-free alignment of linear and asymmetric top molecules. In this continuation of a joint project with the Max-Born-Institute in Berlin, we will exploit our experimental and theoretical advances for the investigation of chemical dynamics in chemical model systems, such as the dissociation of OCS, as well as the imaging of the dynamical interactions between molecular building blocks of life and water, the matrix of life.</p> <p>We are looking for a highly motivated individual with a strong background in experimental AMO physics or gas-phase physical chemistry as well as in quantum mechanics. Knowledge of molecular-beams, ion or electron imaging, ultrafast lasers and optics as well as capabilities for programming are necessary and need to be present or acquired within the first part of the project.</p> <p>Trabattoni, <i>et al.</i>, Küpper: Setting the photoelectron clock through molecular alignment. <i>Nature Communications</i> <b>11</b>, 2546 (2020).</p>
<b>Contact person for scientific questions about the project:</b>	Jochen Küpper: <a href="mailto:office.kuepper@cfel.de">office.kuepper@cfel.de</a>