



2020 HGF – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

Title of the project:

Laser-induced electron diffraction of chemical dynamics

Helmholtz Centre, division/group:

DESY, CFEL Controlled Molecule Imaging (FS-CFEL-CMI)

Project leader:

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Department/Group: (at the Helmholtz centre or Institute)

Center for Free Electron Laser Science (CFEL)

Controlled Molecule Imaging Group

Programme Coordinator (Email, telephone and telefax)

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Description of the project (max. 1 page):

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. This project is in strong collaboration with the group of Arnaud Rouzée at the MBI Berlin and the Max-Planck theory group of Angel Rubio at CFEL Hamburg.

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.



Description of existing or sought Chinese collaboration partner institute (max. half page):

Required qualification of the post-doc:

- PhD in experimental physics, physical chemistry, or a related field
- Experience with ultrashort-pulse lasers, molecular beams, ion and electron imaging (VMI, etc.), is highly desirable
- Additional skills in strong-field physics, numerics, and programming are advantageous
- Language requirement: fluency in spoken and written English