



2023 Helmholtz – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

PART A

Title of the project:

Ultrafast dynamics of microsolvated molecules – from model system to macromolecules and biomolecular assemblies

Helmholtz Centre, division:

Deutsches Elektronen-Synchrotron DESY

Project leader:

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<https://www.controlled-molecule-imaging.org>

<https://photon-science.desy.de>

DESY Group:

Photon Science, Center for Free-Electron Laser Science, Controlled Molecule Imaging

DESY-OCPC Programme Coordinator (Email, telephone and telefax)

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Description of the project (max. 1 page):

The CFEL Controlled Molecule Imaging group (CMI) develops innovative methods to obtain full control over molecules and nanoparticles. These methods and the created controlled samples are exploited in fundamental physics, chemistry, and structural biology studies to unravel the underlying mechanisms of chemistry and biology by watching molecules at work.

Our group developed methods for very cold beams of shockfrozen molecules, macromolecules, and nanoparticles, techniques to select individual species of these molecules, and to fix them in space. We also developed a mobile experimental endstation providing a photoelectron-photoion-coincidence detection system based on a double-sided velocity-map-imaging (VMI) spectrometer and corresponding advanced detector and imaging techniques.

You will improve methodologies to laser control (bio/macro)molecular samples and/or to image these systems at atomic spatial and ultrafast temporal resolution in order to unravel ultrafast (bio)chemical dynamics from small molecules to macromolecular systems. Dependent on background and qualifications, you could be focusing on imaging dynamics on the fastest timescales of small (microsolvated) model systems or on the transfer of ultrafast-dynamics experiments to real biological macromolecules.



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

Open to interested parties; existing contacts to Institute of Atomic and Molecular Physics, Jilin University, could be strengthened.

Required qualification of the postdoc:

- Doctoral degree in experimental physics, physical chemistry, biophysics, structural biology, or a related field
- Highly motivated, independent, and truly innovative teamplayer
- Experience with high-vacuum equipment, optics, short-pulse lasers, modern detectors
- Additional skills in molecular beams or aerosol generation, particle imaging, and mass spectrometry
- Experience in handling chemical/biological samples in the gas phase would be a plus
- Language requirement: English