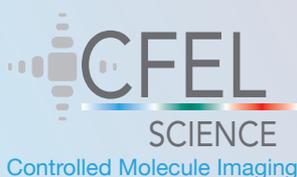


Aerosol transport and focusing



PhD / PostDoc project

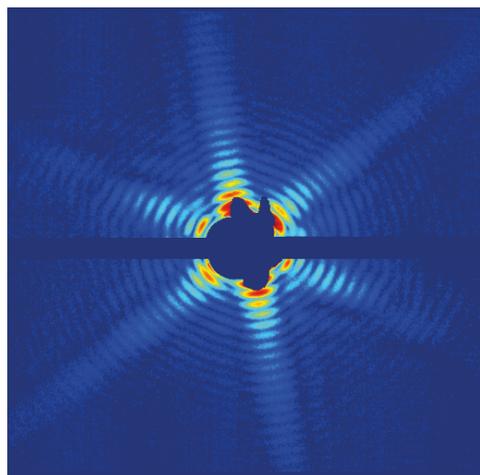
Dr. Daniel Horke (daniel.horke@cfel.de), Prof. Dr. Jochen Küpper (jochen.kuepper@cfel.de)

The Controlled Molecule Imaging group at the Center for Free-Electron Laser Science at DESY and Universität Hamburg performs novel experiments on the control and imaging of gas-phase molecules and their ultrafast dynamics with applications in fundamental physics, chemistry and structural biology.

We develop new experimental approaches to cool and control complex molecules, such as spatial separation of individual molecular species, alignment and orientation of molecules in space, and the creation of well-defined molecular wavepackets. We image molecular structures and dynamics — recording movies of molecules at work — using ion and electron imaging as well as coherent diffractive imaging techniques with x-rays and electrons. This work is accompanied by sophisticated data analysis, computational modeling, and *ab initio* theory developments.

Optimizing transport and focusing of aerosolized particles

Within this project, you will develop novel methods to efficiently transport, focus and confine aerosolized particles, such as proteins, viruses, or artificial nanoparticles, to produce well-controlled particle beams in vacuum.



X-ray diffraction pattern off an isolated nanoparticle.

This work is based on our ongoing efforts to optically control and trap isolated particles, in combination with newly developed aerodynamic lenses and cryogenic particle sources in our group. You will work toward matching the emittance of particles from advanced aerodynamic sources to the acceptance of optical trapping schemes. You will furthermore improve the optical trapping of nanoparticles through dynamic laser beam shaping using spatial light modulators and laser beams with orbital angular momentum.

The developed experimental setups will be employed for novel diffractive-imaging experiments, both at FEL facilities as well as in laboratory based setups.

Phys. Rev. Applied **4**, 064001 (2015) – DOI: 10.1103/PhysRevApplied.4.064001
Opt. Exp. **24**, 6507 (2016) – DOI: 10.1364/OE.24.006507



CMI offers unique research opportunities in an interesting, open, international team and with first-class experimental and computational facilities. Our group is embedded in the Center for Free-Electron-Laser Science, Deutsches Elektronen-Synchrotron DESY, Universität Hamburg, and the Hamburg Center for Ultrafast Imaging.

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



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