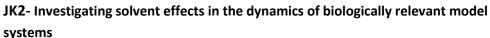
Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter

IMPRS UFAST Call for PhD applications 2023/2024





Title of PhD Proje	ect Investigating solvent effects in the dynamics of biologically relevant model systems
Туре	Experimental
Supervisor(s)	Prof. Jochen Küpper & Dr. Sebastian Trippel
Affiliation(s):	DESY, CFEL, UHH
Number of	1
positions:	
Abstract:	The dynamics of molecules strongly depends on the environment, for instance, thei interaction with solvents. Moreover, hydrogen bonds are of universal importance in general chemistry and biochemistry and it is of great interest to bridge the gap between single isolated molecules and molecules in solvation.
	In this collaborative project, the influence of a few water molecules attached to building block of life, e.g., nucleobases such as adenine, thymine, or uracil, will be investigated in terms of photo-induced ultrafast electronic dynamics. Beams of size selected clusters will be prepared with the advanced technologies available in our group in Hamburg and then studied using photoelectron-and photoion-coincidence-imaging techniques. Recording and correlating a photo fragments allows for a reconstruction of the complete dynamics, potentially even in the molecular frame - that is as if "we were sitting on the molecule".
	Furthermore, the dynamics of specific and unspecific hydrogen bond interactions will be investigated by varying the distance between the solvent and the biomolecule while studying the induced photo-driven processes. The above-mentioned studies will be performed in an ultrahigivacuum using molecular beams and light sources such as high-intensity lasers, synchrotrons, and free-electron lasers (FELs).
	This research project is connected to the collaborative research program "Ultrafast dynamics in intermolecular energy transfer: elementary processes in aerosols and liquid chemistry" (UDIET with partners in Lund (Per Johnsson and Mathieu Gisselbrecht) and Hamburg (Francesca Calegar and Jochen Küpper). A university degree in physics, chemical physics, or in a comparable relevantield is required. Preference will be given to candidates with a completed MSc. We expect experience in areas covering quantum mechanics, molecular physics, molecular dynamics molecular beams, vacuum equipment, ultrafast laser sources including optics, and (Python programming. Experience with large-scale facilities such as synchrotrons or free-electron laser is an advantage.
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scientific questio	ns Dr. Sebastian Trippel: sebastian.trippel@cfel.de



about the project:





