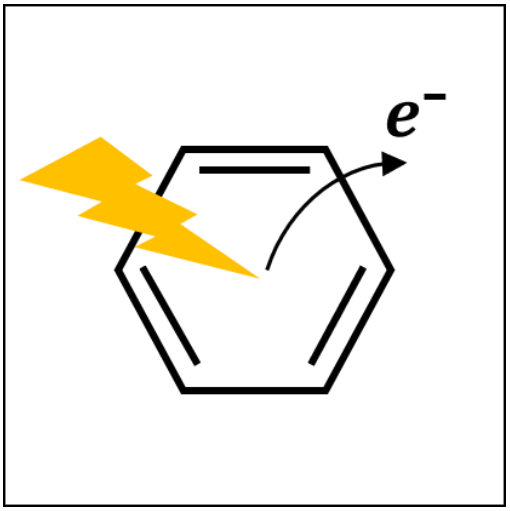
PhD position in multidimensional XUV photoelectron spectroscopy



Photochemical processes play a crucial role in nature. Yet, understanding the underlying molecular dynamics remains a challenge. The main difficulties comprise of the ultrafast timescales of the dynamics paired with a complex interplay of many intra- and inter-molecular degrees of freedom. We will develop a unique experimental method to address these issues. To reduce the complexity of the system, single molecules and small functional units will be isolated in vacuum. The samples will be studied with a new spectroscopic concept combining ultrafast XUV photoelectron spectroscopy with interferometric and multidimensional methods (for preliminary work see [1−4]). As an advantage over established spectroscopic methods, this approach will provide a gap-less mapping of the molecular dynamics with high temporal and spectral resolution.

[1] L. Bruder et al., J. Phys. B: At. Mol. Opt. Phys. **52**, 183501 (2019)
[2] A. Wituschek et al., Nat Commun **11**, 883 (2020)
[3] D. Uhl et al., Optica **8**, 1316 (2021).
[4] U. Bangert et al., Nat Commun **13**, 3350 (2022).

The PhD candidate will join a team of highly motivated researchers led by Lukas Bruder at the University of Freiburg to work on this timely research project. The team will build the new experimental apparatus and investigate prototypical photo-driven reactions ranging from isomerization reactions to intra/inter molecular energy and charge transfer processes. The main focus of the PhD project lies on building and developing the new experimental method and perform experiments with the new setup. **The candidates should bring great interest in building experimental setups.** Depending on the candidate's preferences the PhD project will involve laser engineering and nonlinear optics; the development of the XUV beamline; molecular and cluster beam techniques for sample preparation or photoelectron/-ion detection.

The PhD project will be embedded in the graduate school DynCAM which provides an outstanding environment for the research and career development of the doctoral candidate, including the possibilities for extended research stays at our international collaborators during the PhD project.

Candidates should have strong interest in atomic and molecular physics or physical chemistry. Experience in the use of ultrafast lasers and/or vacuum equipment is desired. Applications including a letter of motivation, a CV, certificates of your university degree (including grades), a transcript of records and contact details of two references should be sent in a **single** pdf file to the email contact in the box. Please indicate the subject "PhD MULTIPLEX" in your email. The position remains open until a suitable candidate is found.

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