



GESELLSCHAFT DEUTSCHER CHEMIKER
ORTSVERBAND HANNOVER

Einladung zum GDCh-Colloquium des Ortsverbandes Hannover

Das Colloquium findet um 17h c.t. im Dr.-Oetker-HS (Raum 007, Gebäude 2504) der Leibniz Universität Hannover, Institut für Physikalische Chemie und Elektrochemie, Callinstraße 3a, D-30167 Hannover statt.

05.06.2025 Dr. Elke Fasshauer

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Watching electrons move - from decay processes to nanomaterials

Chemistry is often described as the rearrangement of atoms or nuclei. But what sets this motion in motion is the fast and collective behaviour of electrons. While chemists use tools like partial charges and curved arrows to make sense of reactivity, these are approximations of a much deeper quantum reality: electrons moving on attosecond timescales, often in strongly correlated ways.

Ultrashort laser pulses now allow us to observe such processes in real time through advanced spectroscopic techniques. However, these experiments alone do not reveal the microscopic mechanisms at work. To interpret them — and to extract a mechanistic understanding — we develop analytical models for time-resolved spectroscopy that describe electronic decay processes such as Auger–Meitner decay and Interatomic Coulombic Decay (ICD).

At the same time, we go beyond simplified models by building many-body quantum dynamics software capable of simulating electron motion from first principles. This allows us to move seamlessly from isolated atoms to complex systems, including nanomaterials. I will illustrate this by discussing the Stark effect in quantum dots, showing how theory connects observables to the underlying dynamics — and how electrons, not just nuclei, truly drive chemistry.

Prof. Dr. Jens-Uwe Grabow
Vorsitz OV Hannover

Vor dem Colloquium findet ab ca. 16h c.t. eine ‚Kaffeerunde‘ mit dem Vortragenden in der Bibliothek des PCI statt.