IAP Seminar

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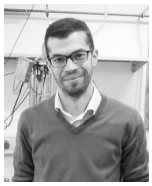

Tuesday, 3rd September 2019, 16:00 s.t.
TU Wien, Institut für Angewandte Physik, E134
1040 Wien, Wiedner Hauptstraße 8-10
Yellow Tower „B“, 5th floor, SEM.R. DB gelb 05 B

Charge-state controlled imaging of electronic transitions in single molecules

Electron transfer plays a crucial role in many chemical processes, from photosynthesis to combustion and corrosion. However, the way in which redox reactions affect individual molecules and, in particular, their electronic structure, remains largely unclear. Unveiling these fundamental aspects requires the development of experimental tools allowing the observation of electron transfer down to the single molecule level. Here, we demonstrate the capability of performing tunnelling experiments on non-conductive substrates to map the orbital structure of isolated molecules upon electron transfer. By driving a change in the redox state of a molecule synchronized with the oscillating tip of an Atomic Force Microscope, previously inaccessible electronic transitions are resolved in space and energy [1].
Our results unveil the effects of electron transfer and polaron formation on the single-orbital scale, opening the door to the investigation of redox reactions and charging-related phenomena with sub-ångström resolution.

[1] L. L. Patera, F. Queck, P. Scheuerer and J. Repp, Nature 566, 245–248 (2019)

All interested colleagues are welcome to this seminar lecture (45 min. presentation followed by discussion).

Friedrich Aumayr
(LVA-Leiter)

Ulrike Diebold
(Seminar Chair)