O 85: Key Note VII

Time: Thursday 10:00–10:30 Location: R1

Plenary Talk O 85.1 Thu 10:00 R1

On-surface reactions and molecular charge-state transitions by atom manipulation — Katharina Kaiser, Shadi Fatayer, Florian Albrecht, and •Leo Gross — IBM Research - Zurich

Molecules can be created using atom manipulation to break and to form covalent bonds. High-resolution atomic force microscopy (AFM) with functionalized tips provides insights into the structure, geometry, aromaticity, charge states and bond-order relations of the molecules created and into the reactions performed [1]. Recently, we generated the elusive molecular carbon allotrope cyclo[18]carbon and resolved its long debated structure [2].

On insulating substrates, we control the charge state of molecules by deliberately attaching and detaching single electrons and measured the reorganization energy of a molecule [3] and recently probed molecular excited states [4]. Moreover, we resolved changes of molecular geometry, adsorption and aromaticity related to its oxidation state [5].

References [1] L. Gross et al. Angew. Chem Int. Ed 57, 3888 (2018). [2] K. Kaiser et al. Science 365, 1299 (2019). [3] S. Fatayer et al. Nature Nanotechnol. 13, 376 (2018). [4] S. Fatayer et al. arXiv:2011.09870 (2020). [5] S. Fatayer et al. Science 365, 142 (2019).