O 1: Overview Talk: Leonhard Grill

Time: Monday 9:30–10:15 Location: HE 101

Invited Talk O 1.1 Mon 9:30 HE 101

Manipulation of Single Functional Molecules: Wires and Motors — •Leonhard Grill — University of Graz, Department of Physical Chemistry, Heinrichstrasse 28, Graz, Austria

Scanning tunneling microscopy can image surfaces and adsorbed molecules with very high spatial resolution, but is also a powerful tool to manipulate single atoms or molecules. In this presentation recent results with two classes of functional molecules will be discussed: molecular wires for charge transport and molecular motors that cause lateral motion across a surface.

Specifically designed molecular building blocks are connected by on-surface synthesis [1] to one-dimensional chains. When pulling such a single molecular wire off the surface, its electrical [2] and mechanical [3] properties are determined in a highly controlled fashion. Examples of molecular wires with donor and acceptor units [2] or molecular nodes that exhibit different conjugation pathways [4] will be discussed. Molecules were also studied in view of fast lateral motion that could be achieved by specific side groups and an improved manipulation protocol [5]. Moreover, molecules with an internal motor were illuminated by light. Enhanced diffusion across the surface and its wavelength-sensitivity can be directly assigned to the motor unit [6].

[1] L. Lafferentz et al., Nature Chem. 4 (2012) 215, [2] C. Nacci et al., Nature Comm. 6 (2015) 7397, [3] S. Kawai et al., PNAS 111 (2014) 3968, [4] C. Nacci et al., Angew. Chem. Int. Ed. 55 (2016) 13724, [5] G. J. Simpson et al., Nature Nanotech. 12 (2017) 604, [6] A. Saywell et al., ACS Nano 10 (2016) 10945.