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CV/ biography

Francesca Moresco got her PhD in in experimental physics in 1998 at the University of Hannover. She is Italian and studied physics at the University of Genova.
From 1999 to 2006, she was research assistant at the Free University in Berlin, starting there her work on molecular switching and manipulation of single molecules. Her habitation work was awarded in 2003 by the Karl-Scheel Prize of the German Physical Society in Berlin.
After an experience in the semiconductor industry, Francesca Moresco joined TU Dresden in 2009 as senior scientist at the Institute of Materials Science. Since October 2017, she leads the Single Molecule Machines research group at the Center for Advancing Electronics Dresden (cfaed), studying electronic and mechanical properties of single molecules at surfaces by scanning tunneling microscopy. Presently, she coordinates the H2020 FET Open European project "Mechanics with Molecules" (MEMO).

FUNCTIONAL MOLECULES SYNTHETIZED ON SURFACE: GEARS, NANOCARS AND WIRES

On-surface synthesis represents a powerful strategy for the generation of complex functional molecules on a surface and opens new perspectives for the development of technology at the atomic scale. In this talk, recent low-temperature scanning tunneling microscopy experiments will be reviewed, where on-surface synthesis is applied to investigate the electronic and mechanical properties of designed molecules.
Mechanical molecular systems can provide an alternative route to transmit information at the nanoscale. To this aim, it is crucial to understand the transmission of motion between molecules anchored on a surface. Furthermore, inelastic tunneling electrons and electric field from the STM tip allow studying fundamental properties of molecules such as dipolar moments and charge transfer to a surface, and their effect on rotational and translational motion. Anchoring strategy for molecular gears based on on-surface reactions and recent examples of manipulation and transmission of motion between molecules will be reviewed [1,2].
In the second part of this talk, I will present the on-surface generation of acenes until the longest acene obtained so far (dodecacene) [3-5]. The acene series represents a unique model system to investigate the intriguing electronic properties of extended π electron structures in the one-dimensional limit, which are important for applications in electronics and spintronics and for the fundamental understanding of electronic transport. I will discuss the evolution with length of the energy gap and of the single tunneling resonances.

References
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