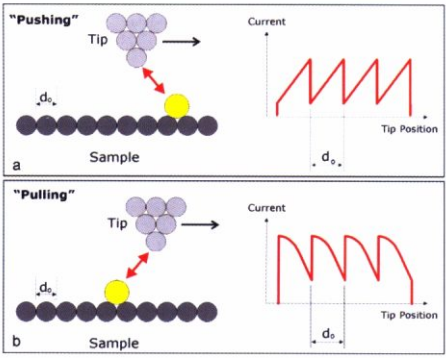
Grill (Free University of Berlin, Germany) reviews recent experiments on specially designed molecules, acting as model systems for molecular nanotechnology. Scanning tunnelling microscopy (STM) enables imaging of molecules with sub-molecular resolution and can also be used as a tool to manipulate single molecules in a controlled way. The results focus on functionalized molecules, which represent model systems for several components in future applications of molecular nanotechnology and molecular electronics, adsorbed on metal surfaces. The substrate is acting on the



Principle of the lateral manipulation of an adsorbate on a surface by using the STM tip. Either repulsive or attractive forces are driving the process, leading to a 'pushing' (a) or 'pulling' mode (b), respectively. The tip is moving in the schematics (left) according to the arrow. The manipulation signal (current curve at constant tip height), plotted to the right, reveals characteristic shapes and the periodicity d_0 of the substrate.

one hand simply as a supporting surface and on the other hand as an electrode (while the other electrode is given by the STM tip). He focuses on key functionalities: lateral rolling and hopping motion on a supporting surface, the switching behaviour of azobenzene derivatives by using the STM tip and the controlled reactivity of molecular side groups, which enable the formation of covalently bound molecular nanoarchitectures.

Functionalized molecules studied by STM: motion, switching and reactivity
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