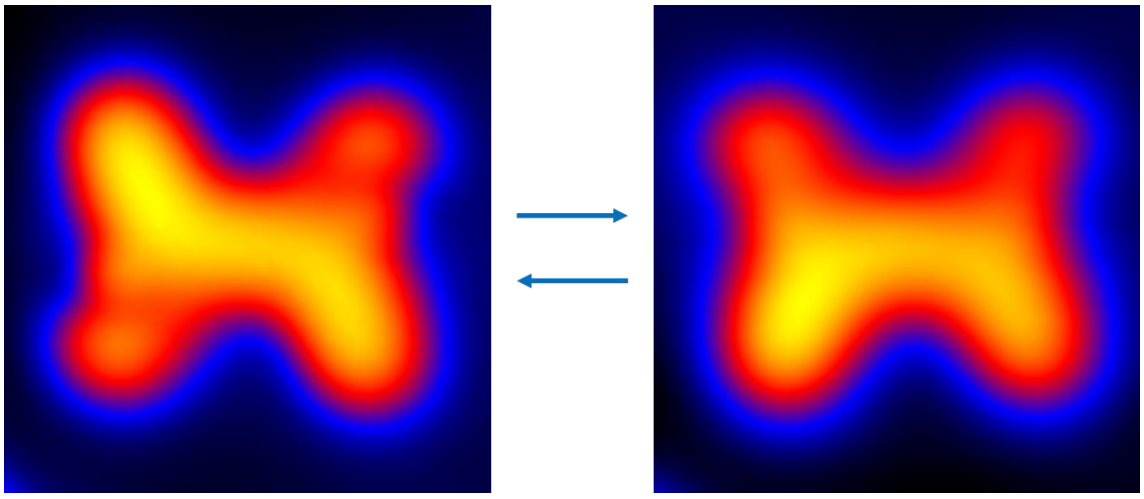
LT-STM induced reversible switching of thiophene based molecule on Au (111)

S. Sarkar[1, 2], K.H. Au-Yeung[1, 2], T. Kuehne[1, 2],
and Francesca Moresco*[1, 2]

[1] *Center for Advancing Electronics Dresden, TU Dresden, 01062 Dresden, Germany*
[2] *Institute for Materials Science, TU Dresden, 01062 Dresden, Germany*

*francesca.moresco@tu-dresden.de

Advancements in nanoscale imaging techniques, such as Scanning Tunneling Microscopy and Spectroscopy (STM, STS), allows not only the addressing of single molecules individually, but through tunneling electrons/electric field stimulation with an STM tip, one can induce and study mechanical behavior and fundamental properties of molecules on surfaces. Here, we present a low temperature STM investigation of a prochiral thiophene-based molecule that self-assembles in large islands with different domains on the Au (111) surface. In these domains, two different conformations of the single molecule are observed, depending on a slight rotation of two adjacent bromothiophene groups. Using voltage pulses from the tip, the molecule is switched between the two conformations. The electronic states have been measured with scanning tunneling spectroscopy, showing that the electronic resonances are mainly localized at the same positions in both conformations. We are able to clarify the switching mechanism and energy entry port for the excitation responsible for the conformational change. Furthermore, we observe that on Ag (111) surface, only one configuration is present and therefore the switching effect is suppressed.



[1] S. Sarkar et al., submitted