physikalisches Kolloquium

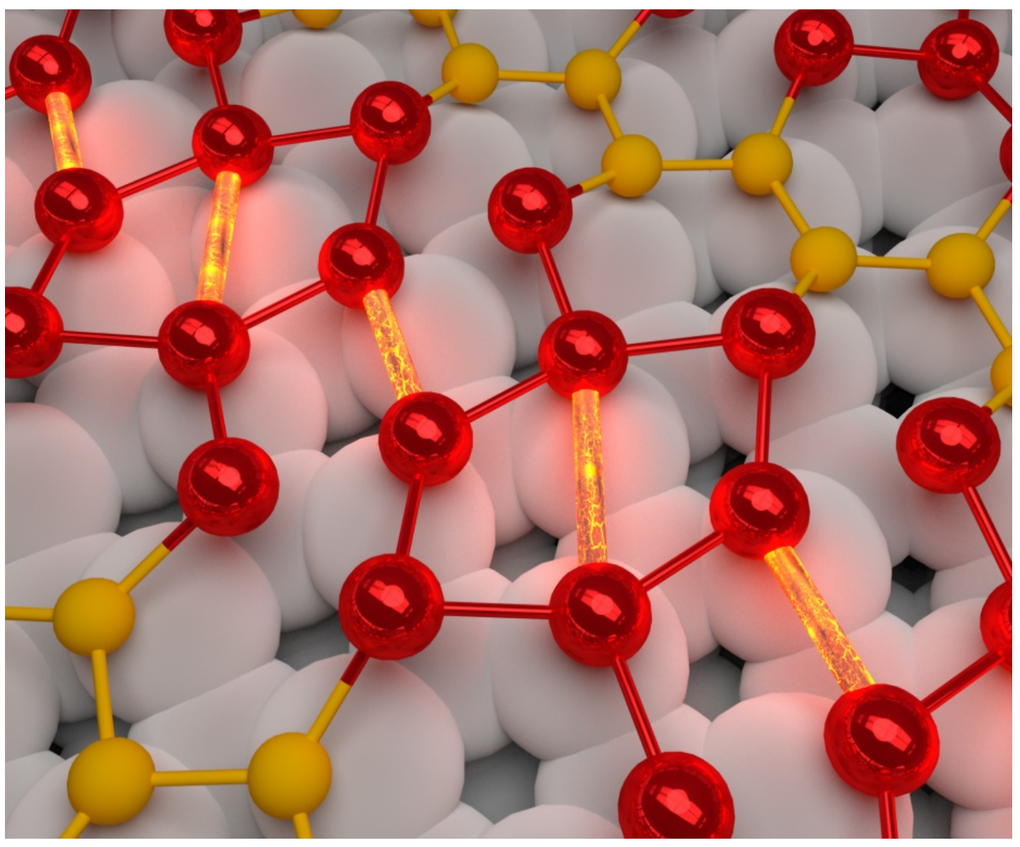
Prof. Dr. Martin Wolf
Department of Physical Chemistry
Fritz Haber Institute
of the Max Planck Society, Berlin

Ultrafast Surface Dynamics and Local Spectroscopy at the Nanoscale

Mo. 11.11.19
16:00 Uhr
Ort: H34

In a Born-Oppenheimer description, atomic motions evolve across a potential energy surface determined by the occupation of electronic states as a function of atom positions. Ultrafast photo-induced phase transitions provide a test case for how the forces and resulting nuclear motion along the reaction co-ordinate originate from a non-equilibrium population of excited electronic states.

Here I discuss recent advances in time-resolved photoemission spectroscopy allowing for direct probing of the underlying fundamental steps and the transiently evolving band structure in the ultrafast phase transition in indium nanowires on Si(111) [1]. Furthermore, I will discuss some recent attempts to access the space-time limit in surface dynamics using local optical excitation of controlled plasmonic nano-junctions and tip-enhanced Raman scattering (TERS) [2,3].



Artists view of the excitation and formation of bonds along Indium nanowires on Si(111) during the ultrafast photoinduced phase transition between the 8x2 and 4x1 structures

References:
[1] C.W. Nicholson et al., Science 362, 821 (2018) & PRB 99, 155107 (2019)
[2] S. Liu et al., PRL 121, 226802 (2018) & Nano Lett. 19, 5725 (2019)
[3] H. Böckmann et al., J. Phys. Chem. Lett. 10, 2068 (2019).

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