Stuttgarter Physikalisches ONLINE Kolloquium

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Dienstag, 21. April 2020 **16.15 Uhr**

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Ultrafast Surface Dynamics and Local Spectroscopy at the Nanoscale

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Abstract

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].

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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).