Universität Münster

Aktuelle Fragen der Nanophysik

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The tale of a Band Melting in a Low-Dimensional Nanostructure

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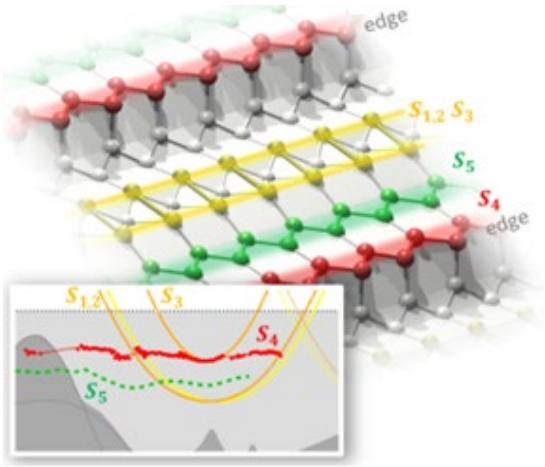
In this presentation, I will share our efforts to comprehend the behavior of electrons on a nanostructured solid-state surface named Si(553)-Au [1-5]. I will discuss our experiments performed by angular resolved photoemission (ARPES) and scanning tunneling spectroscopy (STM). A central observation is a melting of a band; a band disappearing with increasing the temperature although the structure is unchanged. Such tremendous change with temperature is very unusual, typically known for strongly correlated systems like Kondo- or Mott- systems. The band melting points to electronic disorder with suppressed quantum coherence in one direction. With the invaluable insights from my theoretical collaborator, I will discuss this in a phenomenological picture involving Luttinger-liquids and frustrated (pseudo-) spin systems.



[1]P. Chudzinski, L. Dudy, arXiv preprint: arXiv:2203.13688 (2022) [link]
[2] P. Chudzinski et al., submitted to Advanced Materials (in review)
[3]L. Dudy et al., Surface Science 737, 122356 (2023) [link]
[4]P. Chudzinski et al., Physical Review B 104, 205407 (2021). [link]
[5]L. Dudy et al., J. Phys.: Condens. Matter (Topical Review) 29, 433001 (2017). [link]