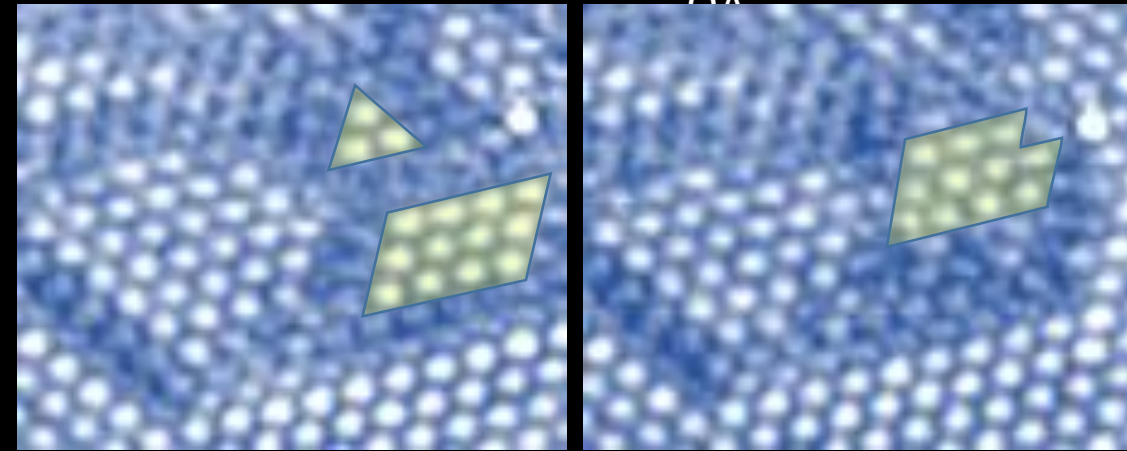


Mesoscopic quantum simulators

Mesoscopic systems have the advantage that they display quantum properties, yet qubits are more individually addressable than in microscopic systems. A good example is 1T-TaS₂, where a large degree of control of single electron states can be achieved on the mesoscopic scale.



Topics of interest:

- Mesoscopic quantum annealers based on designed CDW systems with mesoscopic topological properties.
- Topological protection mechanisms for stabilization of quantum states
- Control of tunneling and thermal annealing rate (external barrier modulation)

Recent papers:

- Vaskivskiy, I. et al. Fast electronic resistance switching involving hidden charge density wave states. **Nature Comms** 7, 11442 (2016).
- Vaskivskiy, I. et al. Controlling the metal-to-insulator relaxation of the metastable hidden quantum state in 1T-TaS₂. **Science Adv.** 1, e1500168 (2015).
- Stojchevska, L. et al. Ultrafast switching to a stable hidden quantum state in an electronic crystal. **Science** 344, 177–180 (2014).
- Svetin, D. et al. Transitions between photoinduced macroscopic quantum states in 1T-TaS₂ controlled by substrate strain. **Appl. Phys. Express** 7, 103201 (2014).