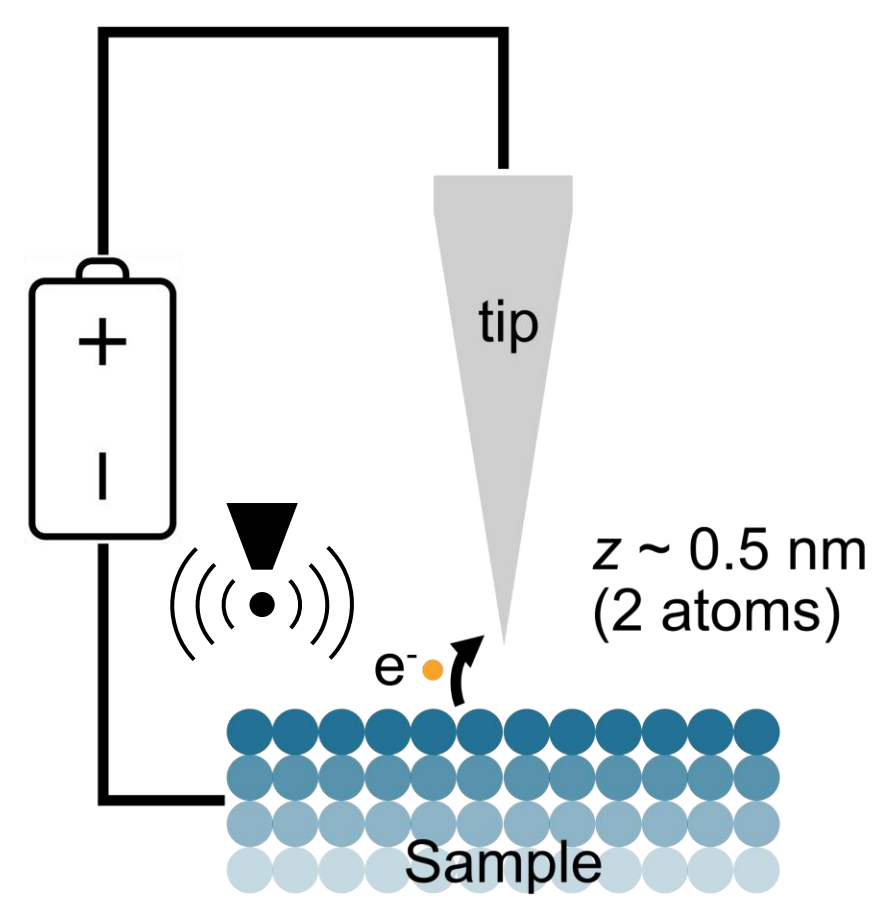
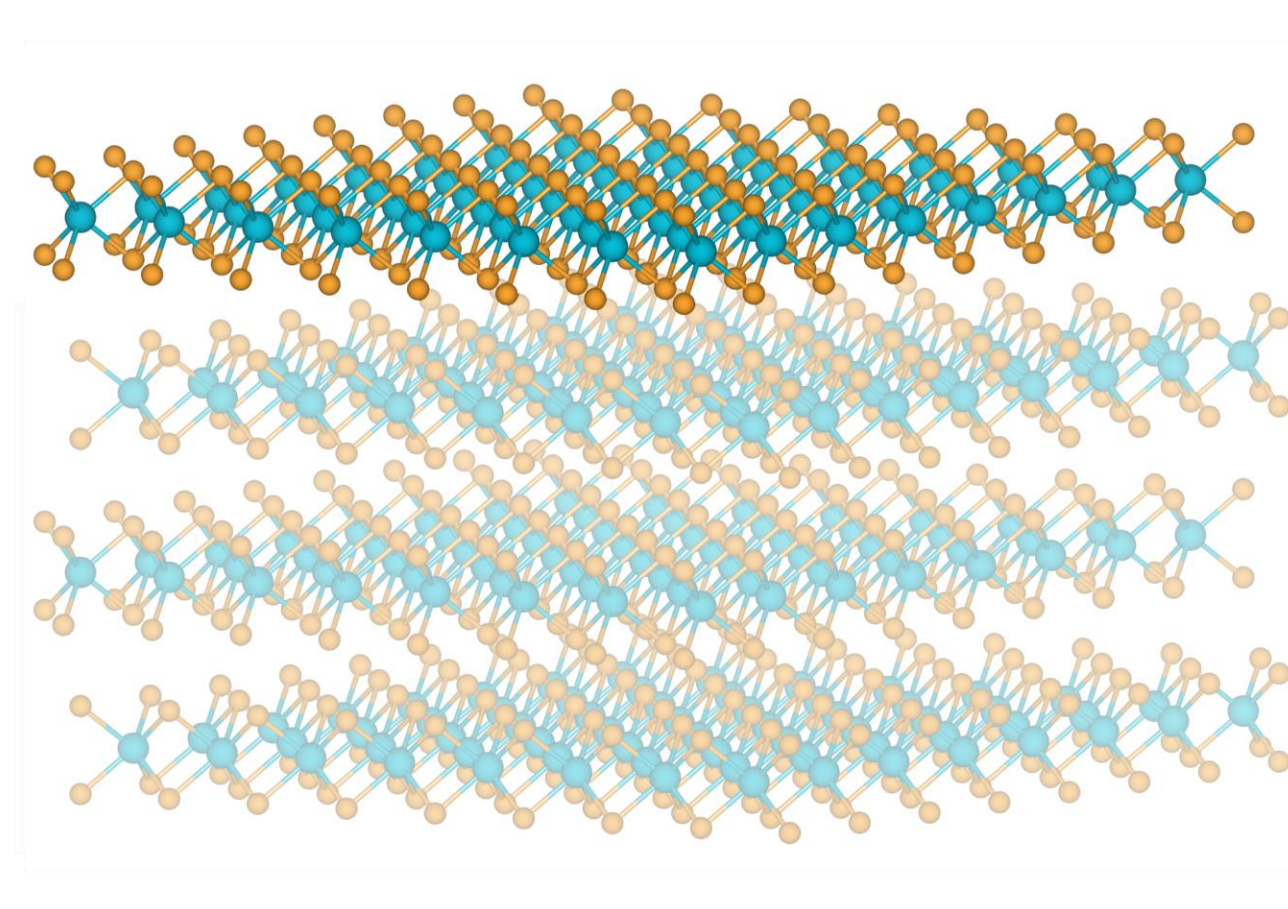


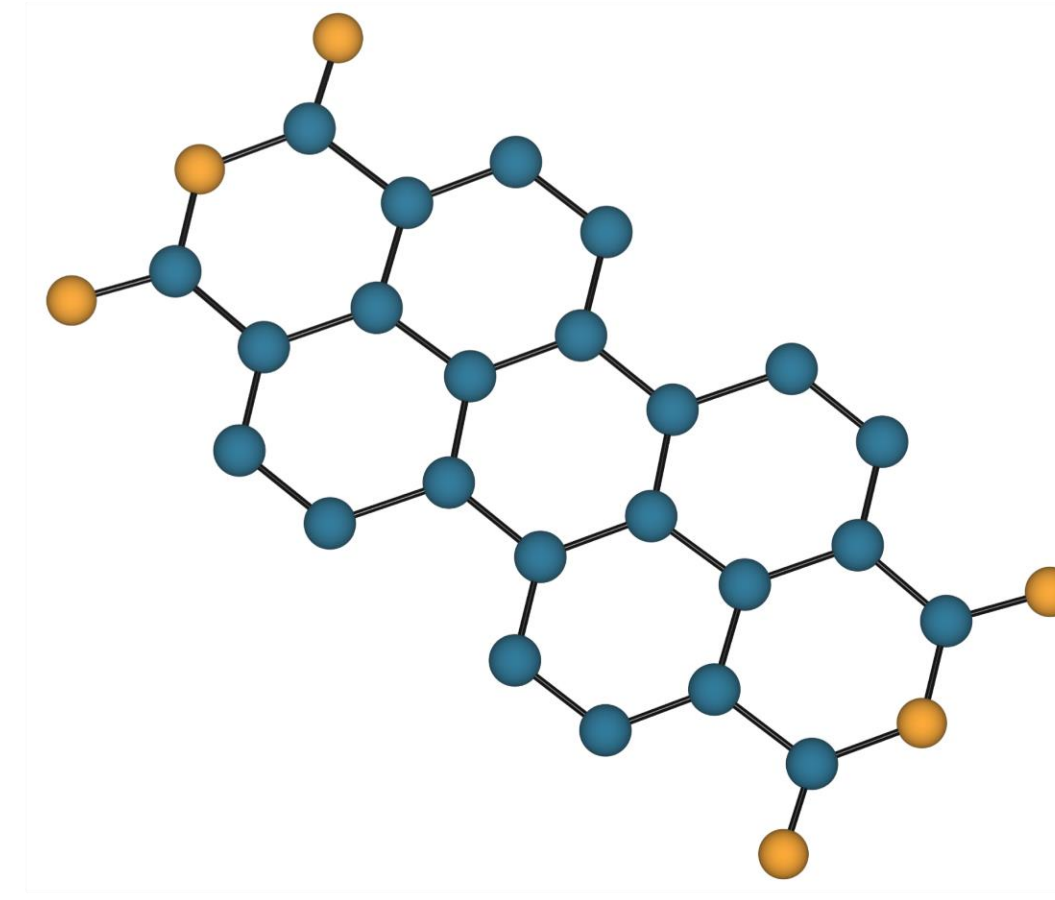
Scanning probe microscopy:



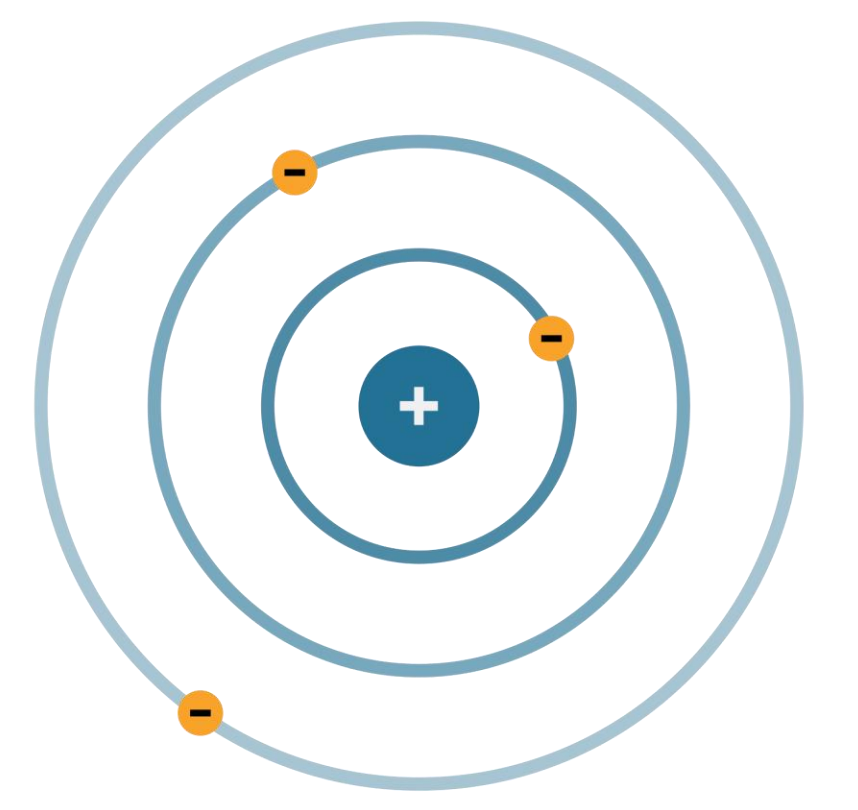
From surfaces...



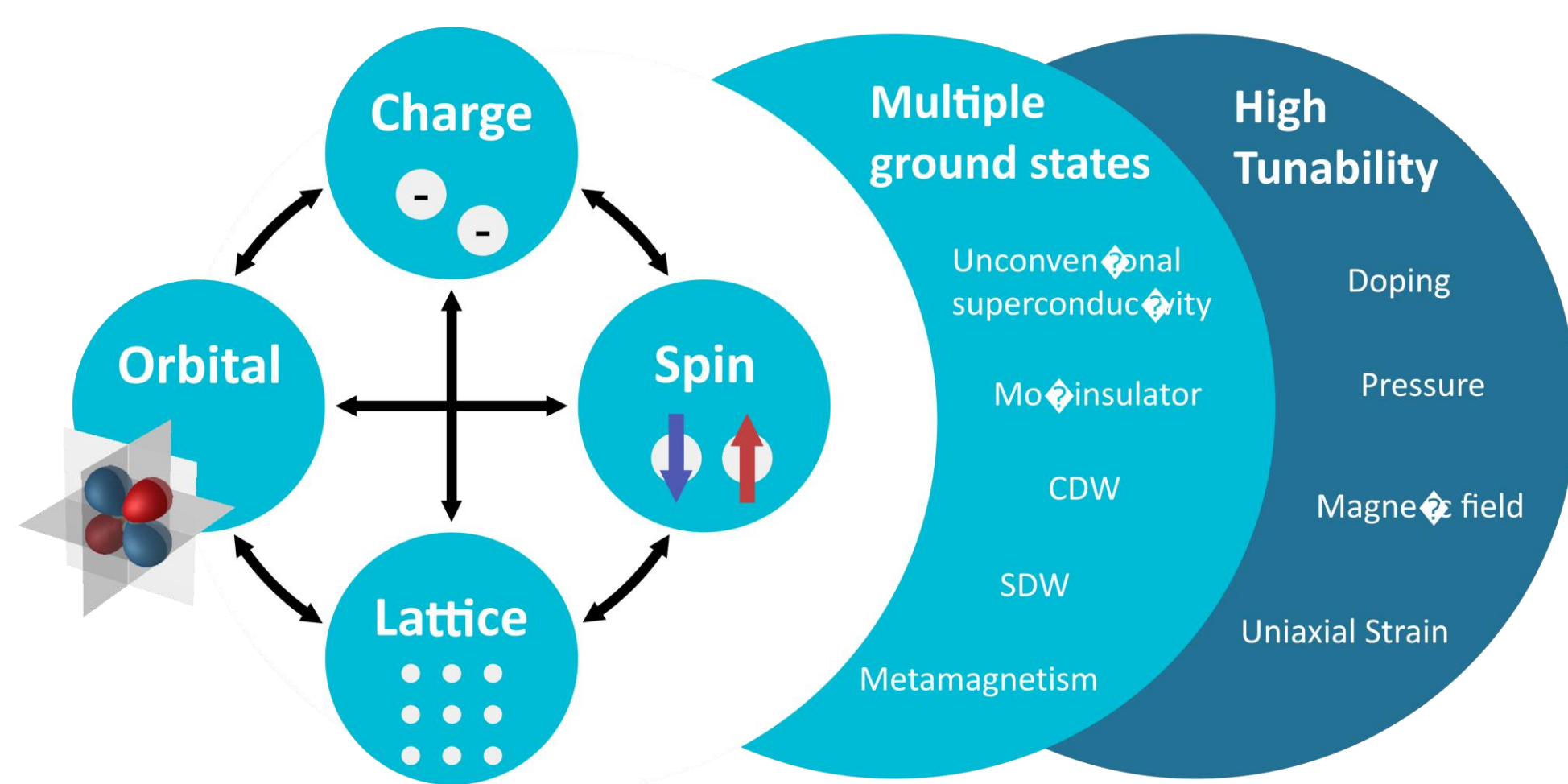
to molecules...



to atoms!

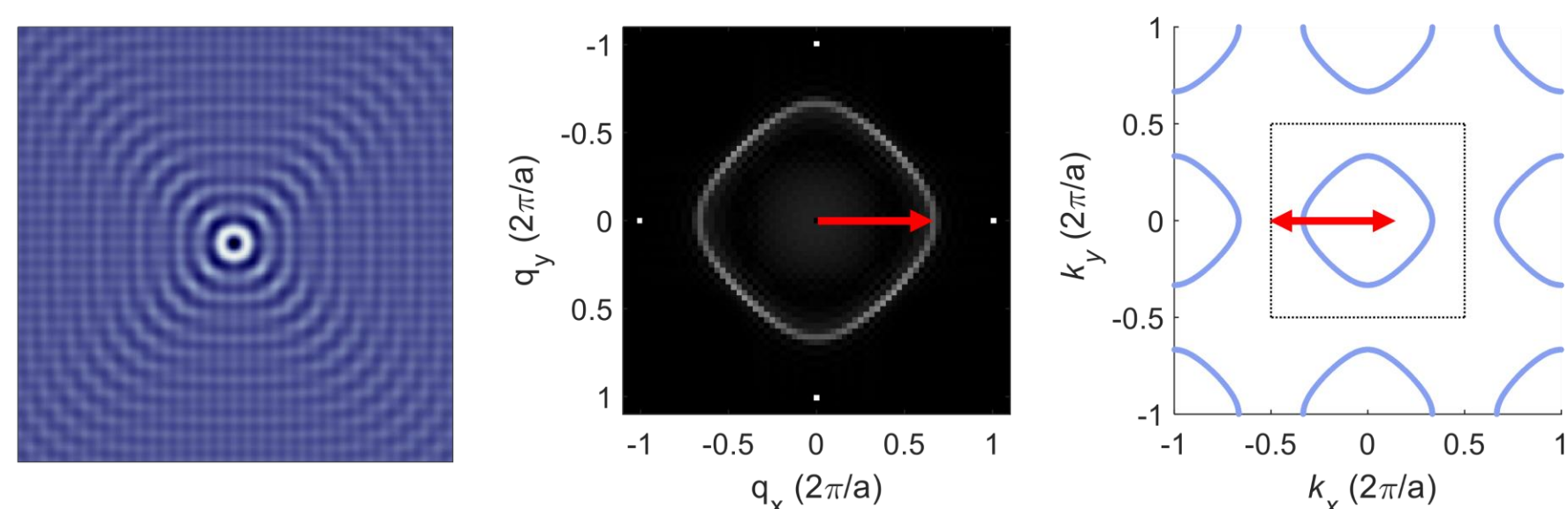


Quantum materials

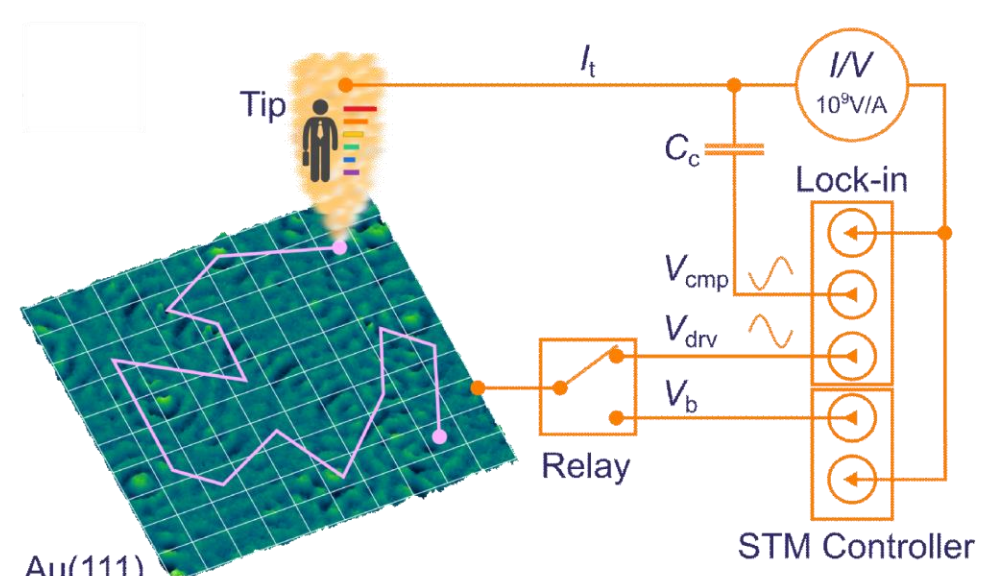


Quasiparticle interference (QPI):

A means to probe the electronic structure



Methodology to speed-up



Sparse sampling:

- Measuring less points

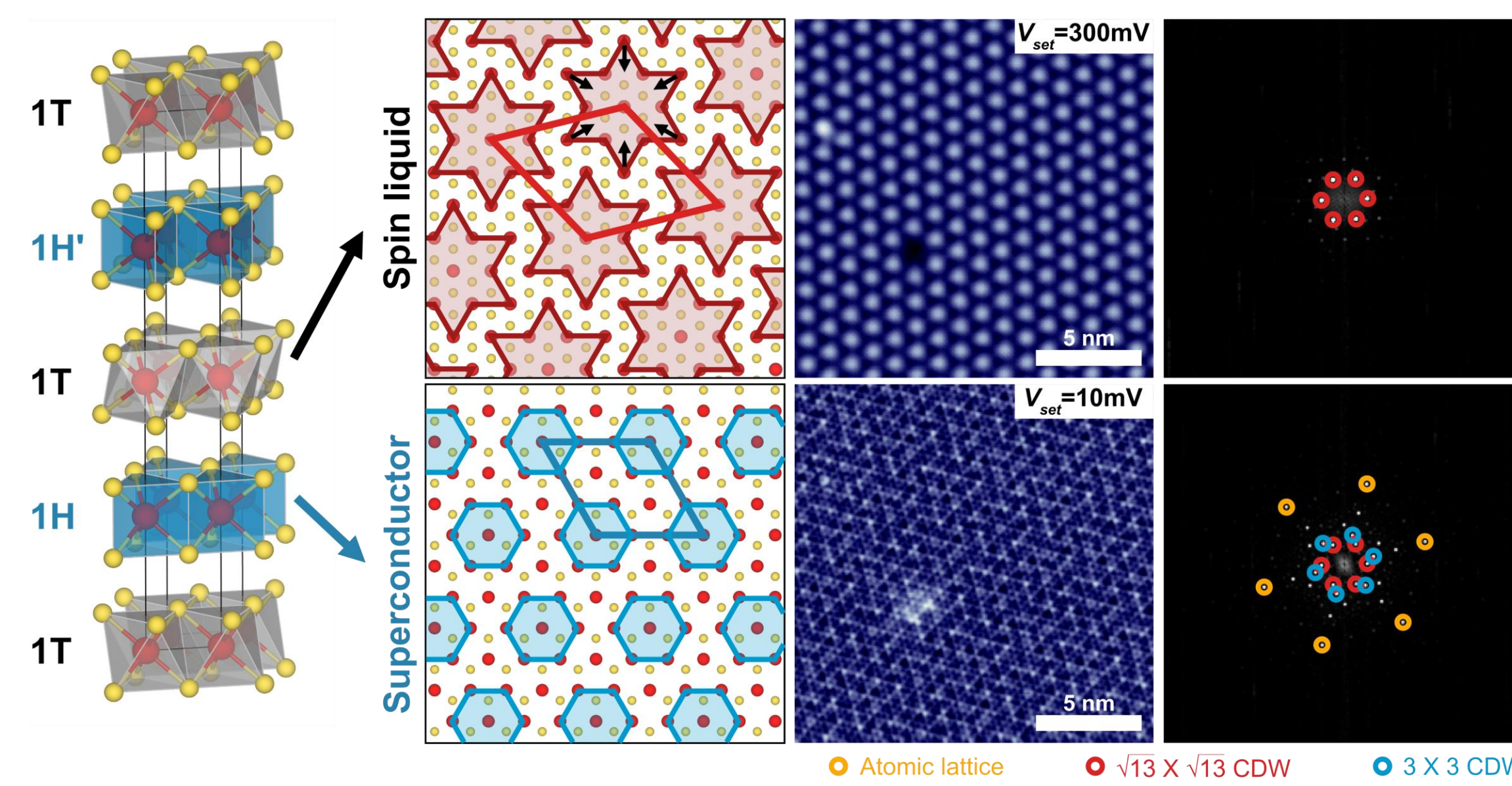
Parallel spectroscopy:

- Measuring spectra faster

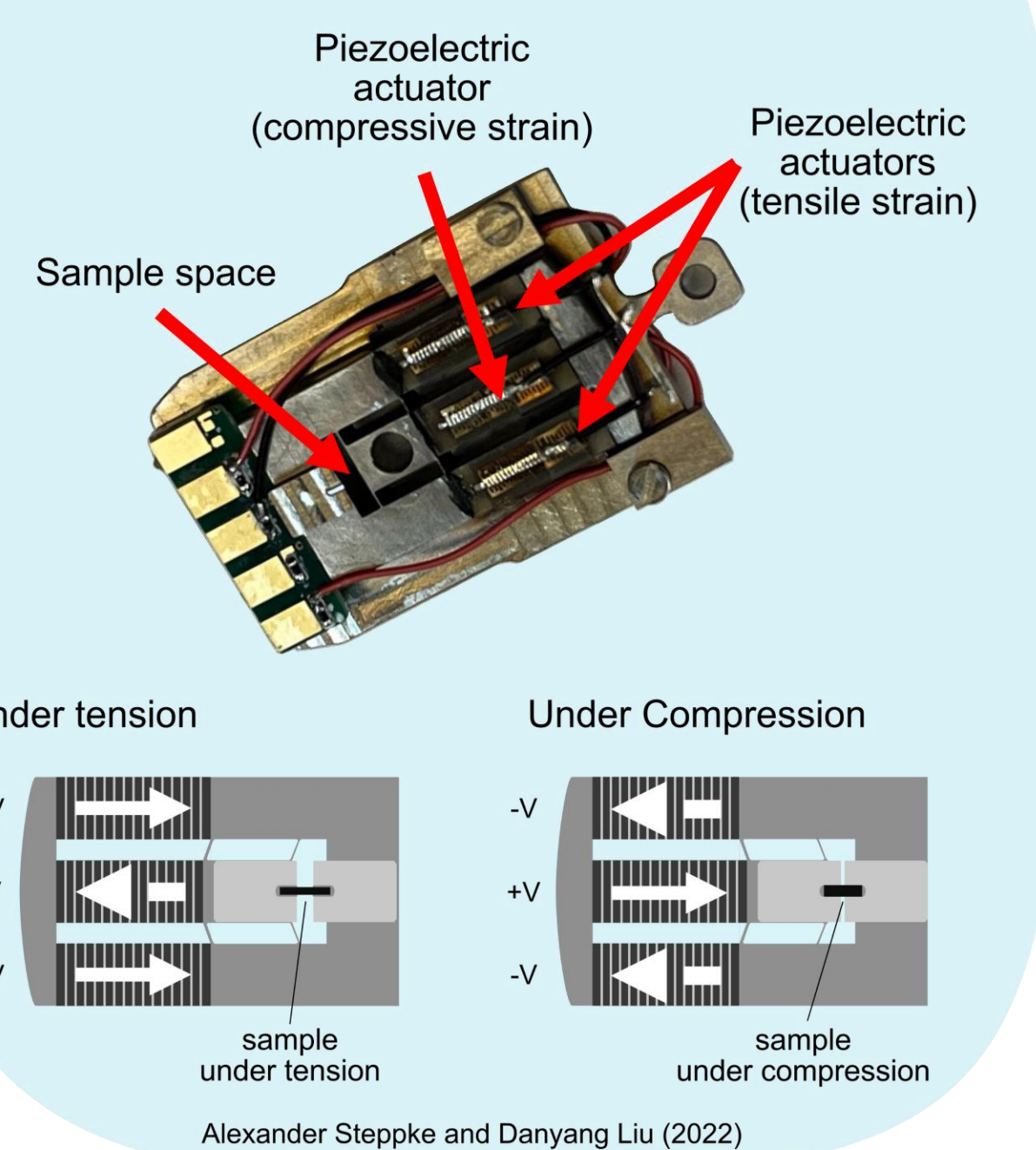
Au(111)
J. Opliger, F. D. Natterer, Phys. Rev. Res. 2, 023117 (2020); B. Zengin et al. Phys. Rev. Res. 3, L042025 (2021);
J. Opliger et al., MethodsX 9, 101784 (2022)

Van der Waals materials:

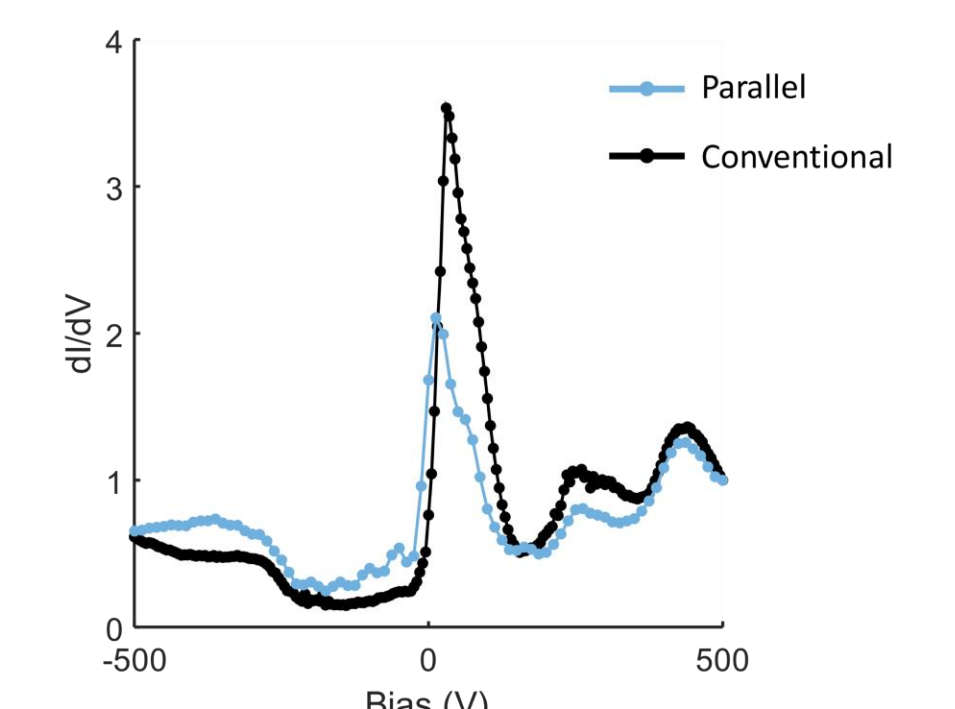
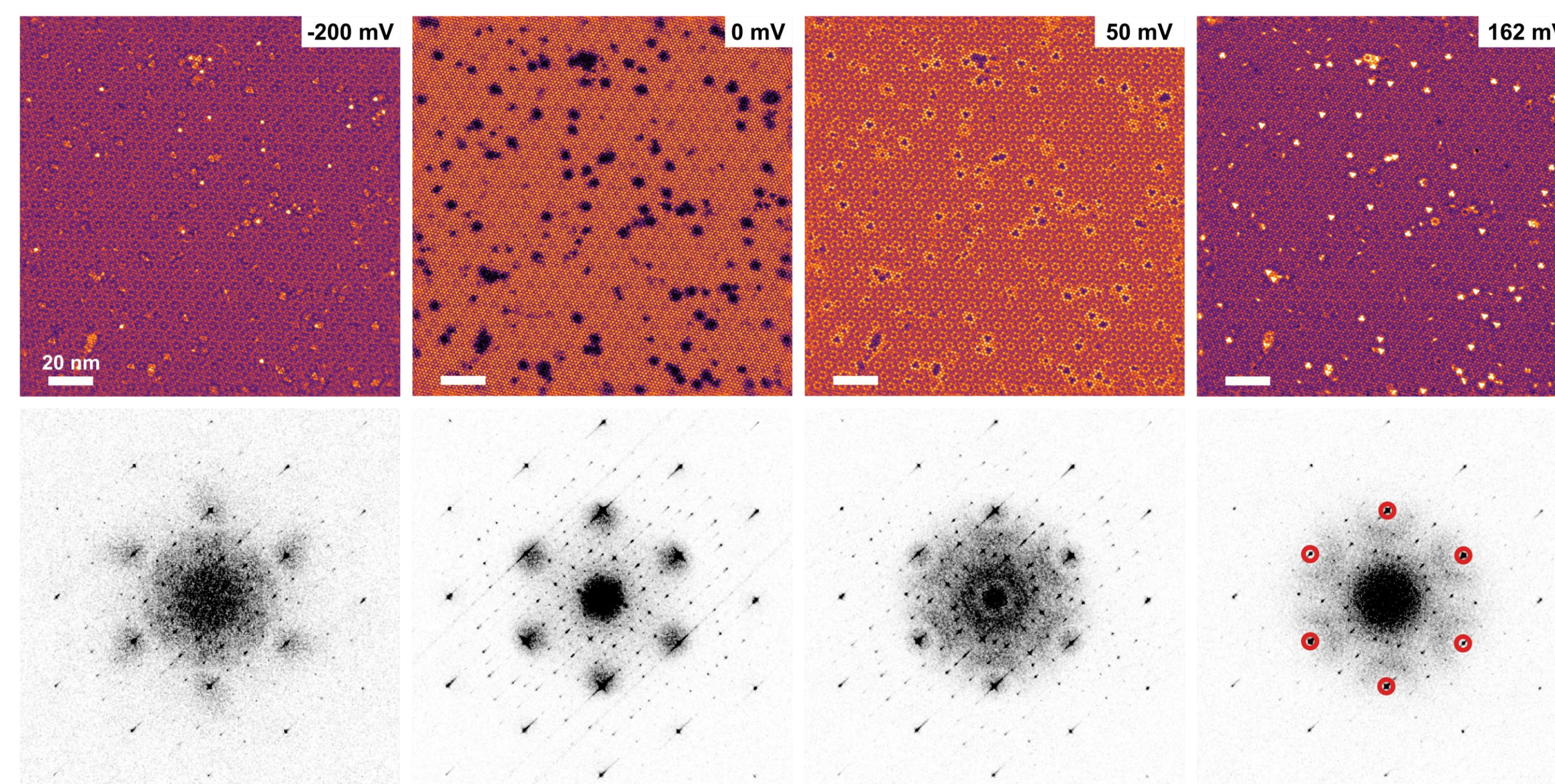
The case of the unconventional $4H_b$ -TaS₂



Design and development of devices for *in-situ* tuning



Fast-QPI on 1T-surface

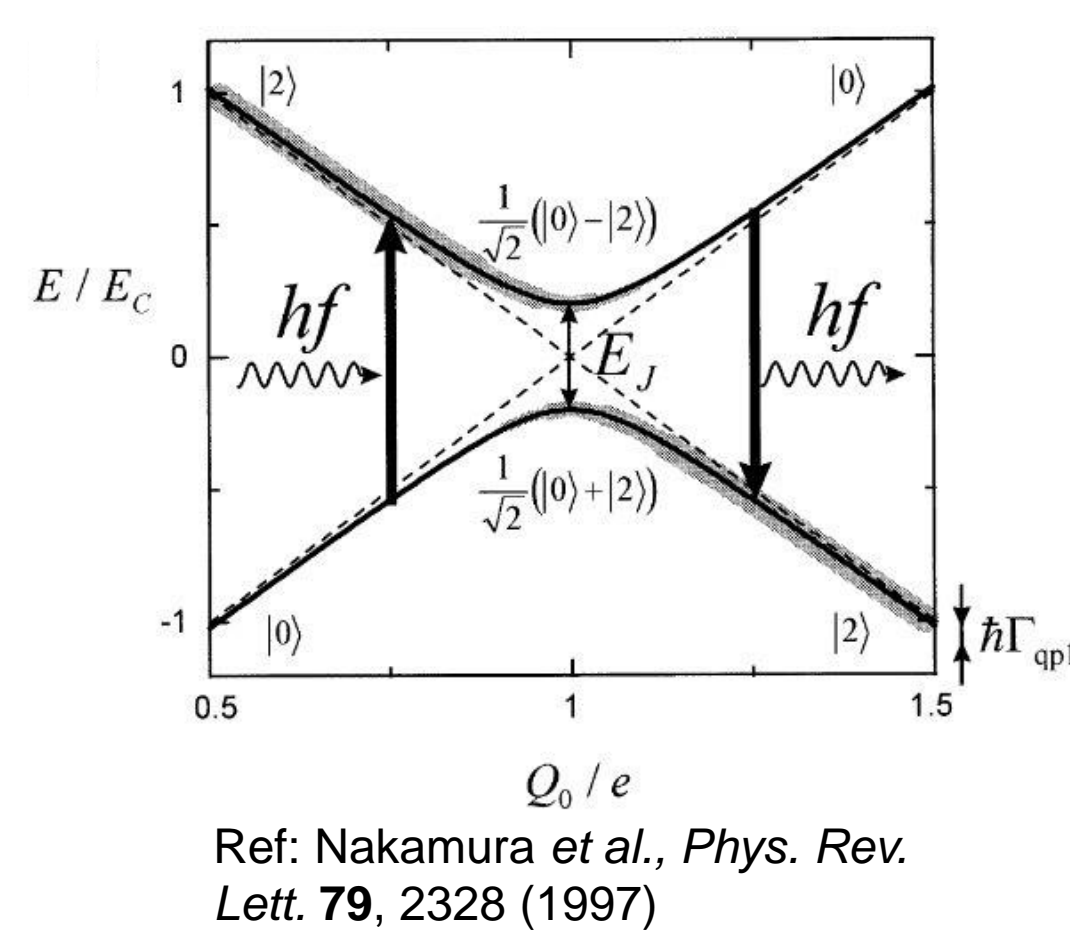
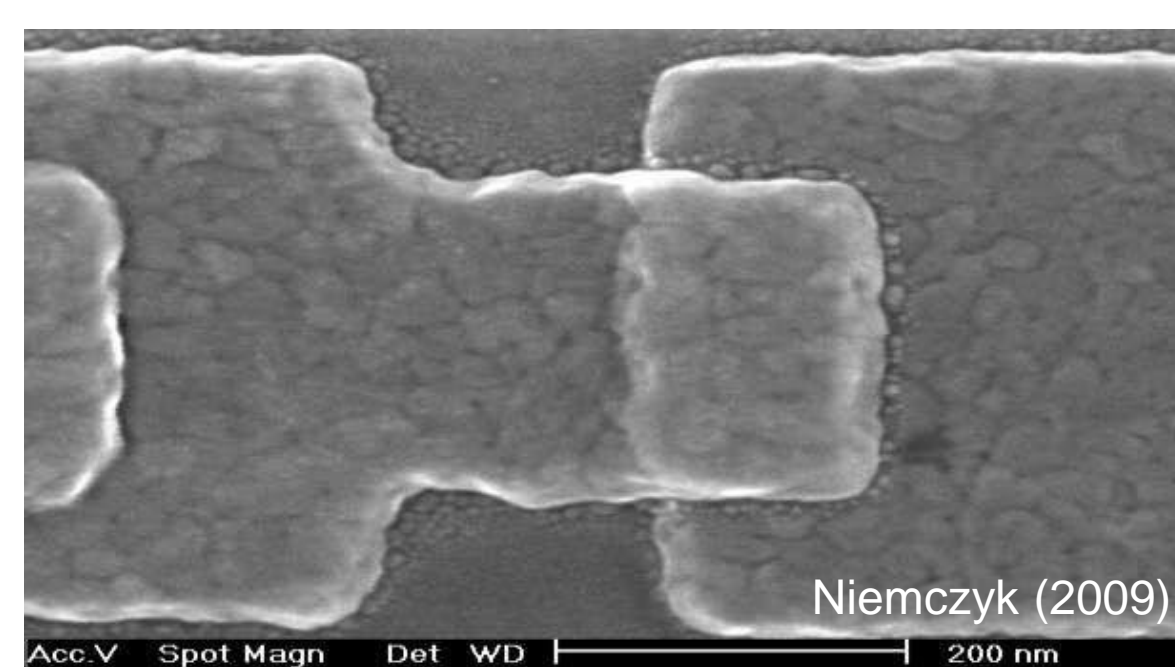
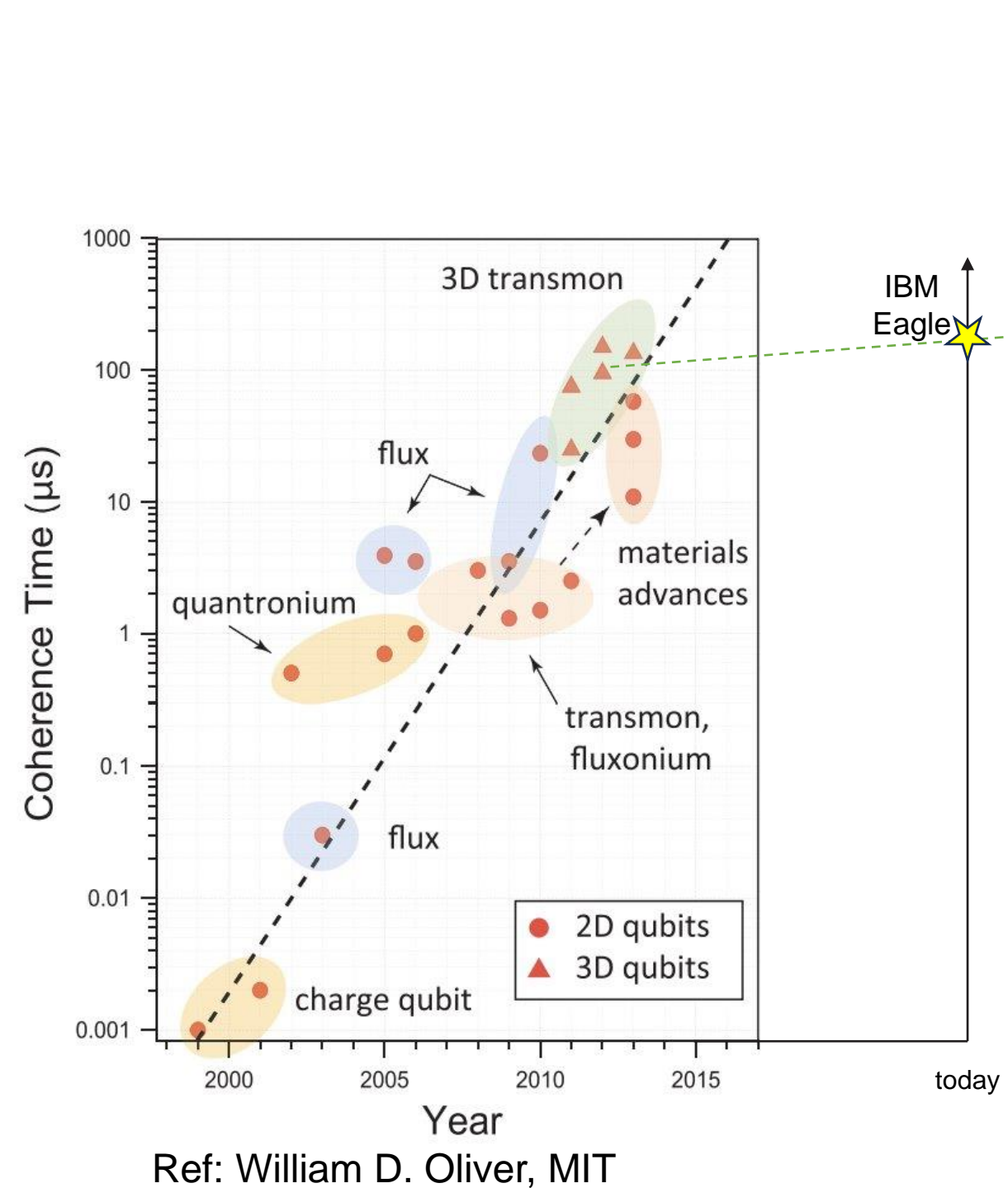


Conventionally:
Total map time 27 days

Fast-approach:
Total map time 2 days

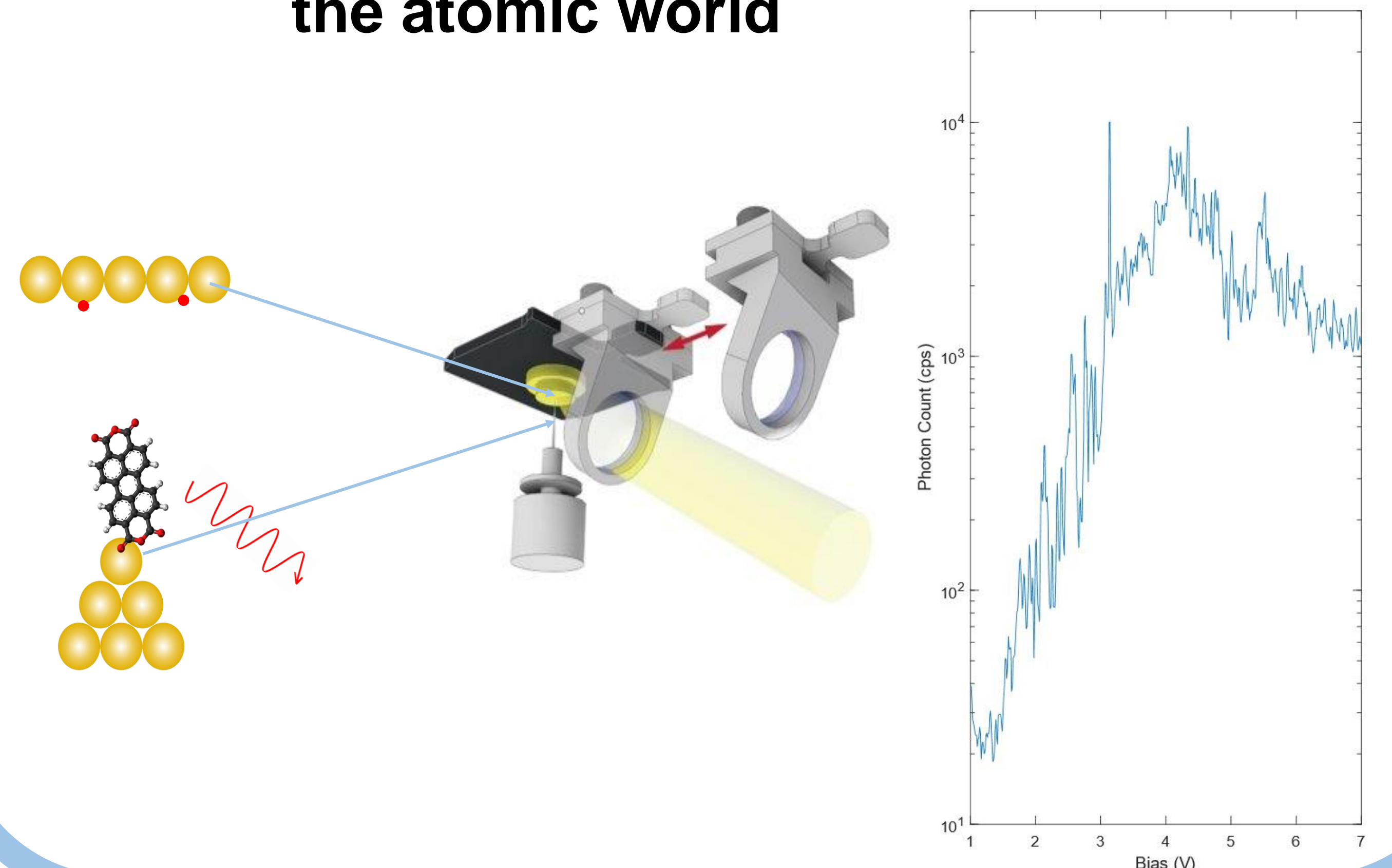
Quantum sensing

Poor coherence in superconducting qubits

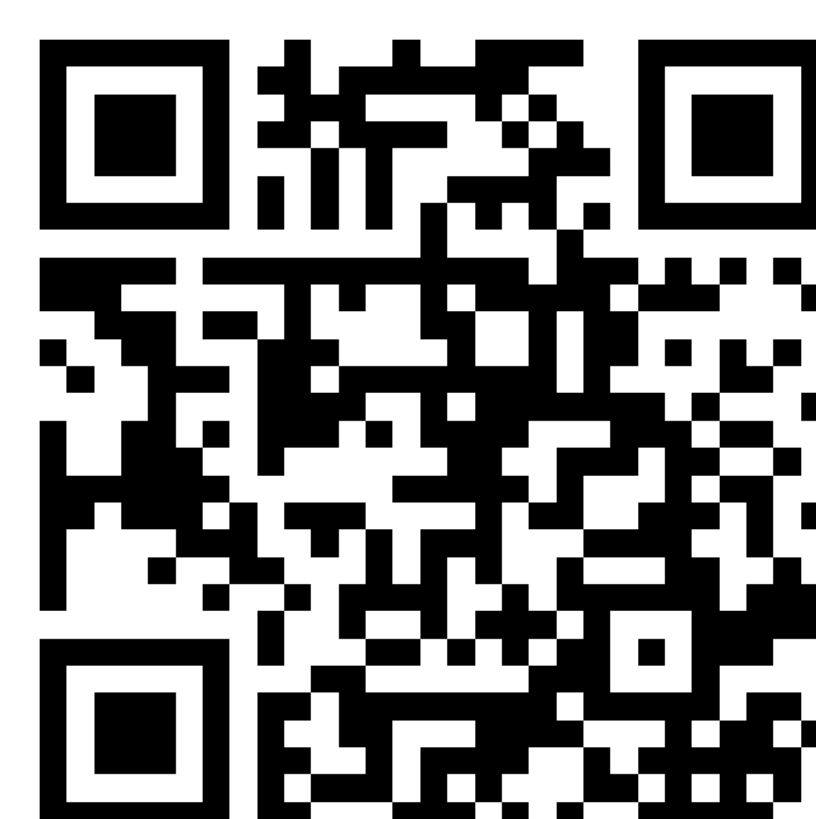
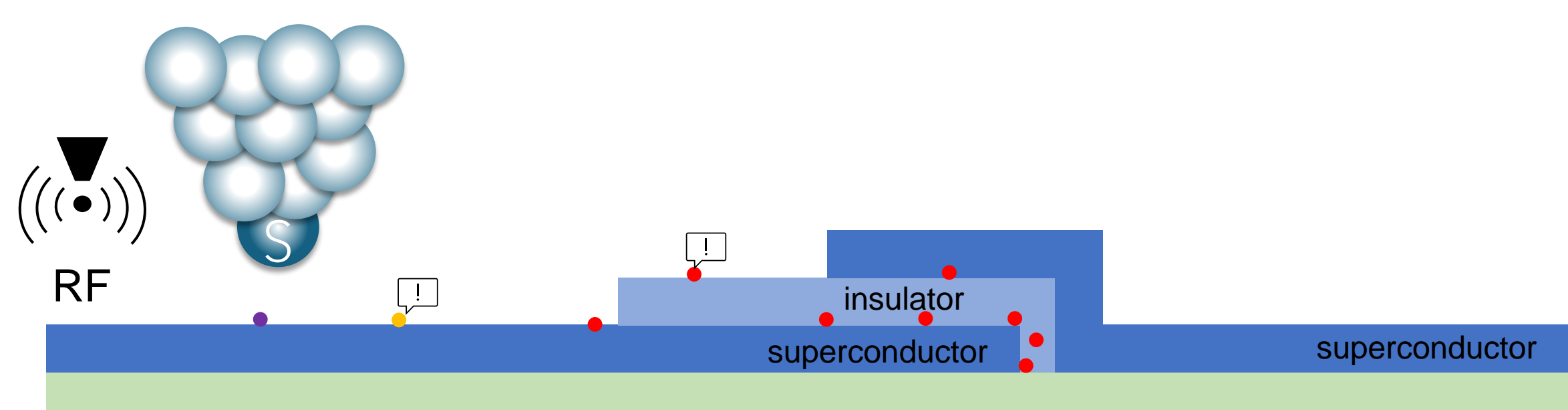


Ref: Nakamura et al., Phys. Rev. Lett. 79, 2328 (1997)

Plasmonic junctions illuminate the atomic world



What's lurking inside a Josephson Junction?



Questions?
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MSc Projects?
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