Single atoms on surfaces: towards a novel quantum platform

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Atom-by-atom addressability using a scanning tunneling microscope (STM)[1] has enabled bottom-up design of functional quantum devices. Furthermore, recent advance of a STM equipped with electron spin resonance allows an atomic scale characterization of quantum states of individual spins on surface with an energy resolution down to nanoelectronvolt.[2] In this talk, I aim at an introduction to coherent quantum platforms crafted atom-by-atom using an STM: First, utilization of single spins for sensing quantum objects at an atomic pre-cision and with a 10 neV energy resolution.[3-4] Second, multi-qubit systems using tailored spin nanostructures on a surface, driven and read out in an all-electrical fashion.[5-7] Third, survey on challenges in hand and outlook of this noble coherent quantum platform.[8]

References:

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