O 21: Surface magnetism – Poster

Time: Monday 18:00–20:00 Location: P2

O 21.1 Mon 18:00 P2

Quantum confinement of spinarons in quantum corrals. — •Raffaele Aliberti[1], Juba Bouaziz[2], Ilias Klepetsans[2], and Samir Luonis[1] — [1]Institute of Physics, Martin-Luther- University Halle-Wittenberg, Germany — [2]Peter Grünberg Institut, Forschungszentrum Jülich and JARA, Germany

For more than two decades, cobalt atoms on noble-metal (111) surfaces have served as a paradigm for the Kondo effect in scanning tun-nelling spectroscopy (STS) experiments. However, our recent first-principles predictions, supported by high-magnetic-field STS measurements, challenge this established view. We showed that the observed transport anomalies originate instead from spin excitations of Co atoms forming a distinct many-body state, the spinaron, which is a polaronic quasiparticle arising from the interaction between an excited magnetic moment and a trapped surface electron. Here, using time-dependent DFT combined with many-body perturbation theory, we investigate quantum-confinement engineering in circular and elliptical quantum corrals hosting a single Co adatom, revisiting the celebrated experiments traditionally interpreted through the lens of the Kondo effect. We demonstrate that confined electronic states significantly modify the underlying electron*boson interactions, thereby altering the amplitude and characteristics of the spinaronic states

O 21.2 Mon 18:00 P2

Spin-polarized LEED and reflectivity in altermagnetic materials — •Sourour Ayari, Aki Pulkkinen, and Jan Minar — New Technologies Research Center, University of West Bohemia in Pilsen, Plzen Czech Republic

Altermagnetic materials exhibit a characteristic non-relativistic spin splitting arising from their unconventional spin-symmetry properties [1-3], which leads to alternating spin textures in momentum space even in the absence of a net magnetization. To probe how these textures manifest at the surface, we use theoretical calculations based on the relativistic Korringa-Kohn-Rostoker multiple scattering method [4-5] to study the spin-polarized low-energy electron diffraction and angle- and spin-resolved reflectivity of electrons. These observables are sensitive to spin-dependent scattering processes and therefore provide a direct window into the surface projections of the altermagnetic spin structure. This approach enables a detailed understanding of the spin-dependent reflectivity in altermagnets and offers deeper insight into their surface electronic and magnetic properties.

References: [1] N. Dale et al., arXiv:2402.13094 (2024). [2] L. Šmejkal et al., Nat. Phys. 18, 404-408 (2022) [3]O Fedchenko, J Minár, A Akashdeep, SW D'Souza- Science advances, 2024 [4]J Krempaský, L Šmejkal, SW D'souza, M Hajlaoui- Nature, (2024) [5] J. Minár & H. Ebert, J. Electron Spectrosc. Relat. Phenom. 190, 159-170 (2013).