

Abstract Submitted
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Sub-molecular modulation of a 4f driven Kondo resonance by surface-induced asymmetry BEN WARNER, FADI EL HALLAK, UCL, NICOLA E ATODIRESEI, Forschungszentrum Juelich, PHILIPP SEIBT, HENNING PRUSER, UCL, VASILE CACIUC, Forschungszentrum Juelich, MICHAEL WATERS, U. of Nottingham, ANDREW J. FISHER, UCL, STEFAN BLUGEL, Forschungszentrum Juelich, JORIS VAN SLAGEREN, U. of Stuttgart, CYRUS F. HIRJIBEHEDIN, UCL — Coupling between a magnetic impurity and an external bath can give rise to many-body quantum phenomena, including Kondo and Hund's Impurity states in metals, and Yu-Shiba-Rusinov states in superconductors. While advances have been made in probing the magnetic properties of d-shell impurities on surfaces, the confinement of f orbitals makes them much more difficult to access directly. Here we show that a 4f driven Kondo resonance can be modulated spatially by asymmetric coupling between a metallic surface and a molecule containing a 4f-like moment. Strong hybridisation of dysprosium double-decker phthalocyanine (DyPc_2) with Cu(001) induces Kondo screening of the central magnetic moment. Misalignment between the symmetry axes of the molecule and the surface induces asymmetry in the molecule's electronic structure, spatially mediating electronic access to the magnetic moment through the Kondo resonance. This work demonstrates the important role that molecular ligands play in mediating electronic and magnetic coupling and in accessing many-body quantum states.

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