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Unraveling surface enabled magnetic phenomena in low dimensional systems MILOS BALJOZOVIC, JAN GIROVSKY, JAN NOWAKOWSKI, PSI, MD EHESAN ALI, INST-Mohali, HARALD ROSSMANN, PSI, THOMAS NIJS, ELISE AEBY, SYLWIA NOWAKOWSKA, DOROTA SIEWERT, UniBasel, GITIKA SRIVASTAVA, PSI, CHRISTIAN WCKERLIN, EPFL, JAN DREISER, PSI, SILVIO DECURTINS, SHI-XIA LIU, UniBern, PETER M. OPPENEER, Uni-Uppsala, THOMAS A. JUNG, PSI, NIRMALYA BALLAV, IISER-Pune — Molecular spin systems with controllable interactions are of both fundamental and applied importance. These systems help us to better understand the fundamental origins of the interactions involved in low dimensional magnetic systems and to put them in the framework of existing models towards their further development. Following our first observation of exchange induced magnetic ordering in paramagnetic porphyrins adsorbed on ferromagnetic Co surface we showed that magnetic properties of such molecules can be controllably altered upon exposure to chemical and physical stimuli [1]. In our most recent work it was shown that a synthetically programmed co-assembly of Fe and Mn phthalocyanines can also be realized on diamagnetic Au(111) surfaces where it induces long-range 2D ferrimagnetic order, at first glance in conflict with the Mermin-Wagner theory. Here we provide evidence for the first direct observation of such ordering from STM/STS and XMCD data and from DFT+U calculations demonstrating key role of the Au(111) surface states in mediating AFM RKKY coupling of the Kondo underscreened magnetic moments [2]. [1] Ballav, N. et al. JPCL, 4, 2303 (2013). [2] Girovsky, J. et al. Second Stage Rev. Nat Commun

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