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Correlation Behavior in Nanoassembled Spin Lattices[1] LAILA S. MATTOS, Stanford University, G.A. FIETE, UC Santa Barbara, B.A. JONES, C.P. LUTZ, D.M. EIGLER, IBM Almaden, H.C. MANOHARAN, Stanford University — The single-impurity Kondo problem, in which an isolated magnetic impurity in a non-magnetic metallic host has its spin screened by that of the conduction electrons, has been extensively studied both theoretically and through bulk experiments. Only recently, however, have new methods allowed detailed experimental probing of single-impurity Kondo effect of individual magnetic atoms. When many magnetic impurities are present in a bulk conductor or on its surface, the interactions between them may engender novel collective effects. Using a scanning tunneling microscope (STM) we assembled and studied atomically precise periodic arrangements of (magnetic) Co atoms and (non-magnetic) CO molecules on the Cu(111) surface. We observe signs of spin correlation effects when the lattice row spacing for the Co lattices approached half of the Fermi wavelength for the Cu(111) surface electrons. Removing the central atom in each lattice and directly probing the energetics of the resulting hole provides a novel method to search for global spin correlations and investigate Kondo hole behavior in these systems.

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