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The Effects of Kondo Physics on Surface State Mediated Exchange Interactions ANDREW ALLERDT, ADRIAN FEIGUIN, Northeastern Univ — We study the problem of two quantum spin-1/2 impurities on the (111) surface of a metal which hosts a Shockley surface state. Using a three orbital model for the bulk, the band structure is fitted to that of copper. We use an exact numerical method that combines a Lanczos transformation to map the band structure onto a one-dimensional chain, and the the density matrix renormalization group (DMRG) to solve the equivalent many-body problem. We find a non-trivial competiton between Kondo screening and indirect exchange coupling between the impurities, departing significantly from the standard 2D RKKY interaction. Effects of the bulk states are shown to play a crucial role by modifying the modulation of the RKKY interaction and enhancing screening effects. For comparison, a study of the triangular lattice is also presented.

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