Abstract Submitted for the MAR05 Meeting of The American Physical Society

Bimodal electronic structure of isolated Co atoms on Pt(111)YOSSI YAYON, XINGHUA LU, MICHAEL CROMMIE, U.C. Berkeley Physics Dept. and Material Science Division, LBNL — Co atoms deposited onto Pt(111)have been found to have a giant magnetic anisotropy energy ($\sim 9 \text{meV}$), and therefore constitute a promising system for nanomagnetism and quantum information based applications [1]. We have used low temperature (5K) scanning tunneling microscopy and spectroscopy to probe the local electronic structure of Co adatoms on the Pt(111) surface. We observe two varieties of Co adatoms (with equal probability) that differ in their dI/dV spectra at energies around 80meV below the Fermi energy. We find that this contrast in spectral density depends on the binding site of the Co adatoms. Atoms at different surface lattice sites (i.e., fcc versus hcp sites) exhibit different local density of states (LDOS). Manipulation of a Co atom from one kind of lattice site to the other results in the expected change in the LDOS behavior. dI/dV spectra measured in this study were normalized using a new method that compensates for differences in tunneling current that occur at different surface sites. Such normalized spectra are quite useful in predicting the spatial contrast of dI/dV maps. [1] P. Gambardella et al., Science **300**, 1130 (2003).

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