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Spin-polarized scanning tunneling spectroscopy of individual magnetic adatoms YOSEF YAYON, VICTOR BRAR, MICHAEL CROMMIE, Department of Physics, University of California at Berkeley, Berkeley, California 94720-7300, LAX SENAPATI, STEVE ERWIN, Center for Computational Materials Science, Naval Research Laboratory, Washington DC 20375 — An important goal in condensed matter physics is the ability to measure the spin-polarization state of a single magnetic atom or impurity. We have used spin-polarized scanning tunneling spectroscopy (SP-STs) to probe the local spin-dependent electronic structure of isolated Fe and Cr adatoms deposited onto magnetic Co islands on a copper surface. Individual Fe and Cr atoms prepared in this way show strong spin-polarized contrast in their dI/dV spectra. The spectra of Fe and Cr adatoms differ in that Fe atoms couple ferromagnetically to the Co islands while Cr adatoms couple antiferromagnetically to the islands. dI/dV spatial mapping reveals spin-dependent contrast in the spatial features of individual Fe and Cr atoms. Density functional theory calculations support our interpretation of the experimental results.

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