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Tailoring the Kondo Effect in Composite Magnetic Systems DEUNG-JANG CHOI, SHICHAO YAN, JACOB BURGESS, STEFFEN ROLF-PISSARCZYK, SEBASTIAN LOTH, Max Planck Institute for the Structure and Dynamics of Matter, Hamburg, Germany — We manipulate different transition metal atoms and build chains using a sub-Kelvin scanning tunneling microscope (STM). The chains composed of transition metal atoms form a highly correlated spin singlet ground state exhibiting a Kondo resonance. By studying temperature and magnetic field dependence, we confirm the Kondo effect in this composite system. We find that the occurrence of the Kondo resonance sensitively depends on the length of the atomic chain and the spin anisotropy energy of each atom. We construct chains with different elemental composition and obtain various spin ground states. In this way, we can tailor the singlet ground state on and off and also modify its strength. The addition of vector magnetic fields to the atomically assembled nanostructures provides another parameter that can continuously tune the behavior of atomic spins. This opens up a fruitful experimental model spin system to be conquered and makes it possible to engineer many-body effects in prototypical spin structures at atomic dimensions.

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