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Spin-dependent effects in transport through individual molecules and nanoparticles J. J. PARKS, E. S. TAM, S. FLORES-TORRES, H. D. ABRUNA, D. C. RALPH, Cornell University — We report measurements of electron transport through individual molecules and nanoparticles incorporated into electromigrated break junction devices. In low-temperature studies of a thiol-terminated organometallic complex using a mechanically controllable break junction, we have studied the effects of molecular distortions. We find that as a function of stretching the molecule, a zero-bias Kondo peak can split into two finite-bias peaks, reminiscent of singlet-triplet transitions in other types of quantum dots. We discuss possible mechanisms in terms of coupling between broken spatial symmetries and the spin state of the molecule. We also measure devices in which molecules and nanoparticles are contacted by ferromagnetic electrodes, so as to study the interplay of spin polarization with single-electron charging effects.

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