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Magnetoresistance of atomic-scale electromigrated nickel nanocontacts ZACHARY KEANE, LAM YU, DOUGLAS NATELSON, Rice University — We report measurements of the electron transport through atomic-scale constrictions and tunnel junctions between ferromagnetic electrodes. Structures are fabricated using a combination of e-beam lithography and controlled electromigration. Sample geometries are chosen to allow independent control of electrode bulk magnetizations. As junction size is decreased to the single channel limit, conventional anisotropic magnetoresistance (AMR) increases in magnitude, approaching the size expected for tunneling magnetoresistance (TMR) upon tunnel junction formation. Significant mesoscopic variations are seen in the magnitude and sign of the magnetoresistance, and no evidence is found of large ballistic magnetoresistance effects.

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