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Spin transport through atomic scale chromium Coulomb islands¹ MARC VAN VEENHUIZEN, JAGADEESH MOODERA, Massachusetts Institute of Technology — Electrical current through metallic islands coupled via tunnel barriers to external leads is governed by the Coulomb repulsion and can be brought down to single electron transport. The spin-degeneracy of the electrons can be lifted by choosing both the leads and the islands to be magnetic. The combination of spin-splitting and Coulomb blockade creates a device geometry capable of resonant tunneling of a single spin-direction only. Maximum effect can be obtained by minimization of the size of the Coulomb islands in order to suppress spin-relaxation. We report on our efforts to make a spin-resonant tunneling device using atomic size clusters of chromium atoms, submerged in an alumina-barrier in a conventional magnetic tunnel junction set-up. The $300x300 \ \mu\text{m}^2$ size magnetic tunnel junction consists of a cobalt bottom electrode, an aluminum-oxide tunnel barrier, a deltadoping layer of chromium in the range of $1-6\ \mathring{A}$, an alumina tunnel barrier, and a

permalloy top-electrode. Transport measurements reveal Coulomb blockade behav-

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