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An atom chip for studying interactions between atoms and metal surfaces J.D. CARTER, O. CHERRY, Department of Physics and Astronomy, University of Waterloo, J.D.D. MARTIN, Department of Physics and Astronomy & Institute for Quantum Computing, University of Waterloo — Magnetic microtraps (atom chips) typically use μm scale current-carrying wires on a substrate to confine cold atoms in magnetic field minima. The high field gradients achievable in such devices can be used to create small clouds of atoms at well-defined (and variable) distances from the surface of a chip. *In situ* excitation of the trapped atoms to Rydberg states can be conveniently used to investigate interactions between Rydberg atoms and the surface of the chip, without the complication of atomic motion inherent in experiments using atomic beams. However, stray electric fields from the current-carrying wires make Rydberg excitation problematic. To overcome this problem, we have fabricated a chip with an electrostatic shield over the wires. We will present preliminary experimental results using ^{87}Rb and discuss the effects of inhomogeneous electric fields due to surface imperfections.

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