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Studies of Xenon Rydberg Atoms at Au(111) and Heavily-**Doped Si(100) Surfaces¹** HARDIN DUNHAM, JIM LANCASTER, F. BARRY DUNNING, Department of Physics and Astronomy, Rice University, STEPHEN WETHEKAM, Institute of Physics, Humboldt University of Berlin — The ionization of xenon atoms excited to the lowest states in the n=17 and n=20 Stark manifolds at a flat Au(111) surface is being studied. The data show that, despite the strong perturbations in the energies and structure of the atomic states that occur as the surface is approached, the experimental data can be well fit by assuming that the ionization rate on average increases exponentially as the surface is approached, and the inferred mean ionization distances are in good agreement with theoretical predictions. Under appropriate conditions, each incident atom can be detected as an ion. Similar studies are underway using heavily-doped n- and p-type Si(100)surfaces. Marked differences in behavior to the Au(111) surface are observed and further work is being undertaken in an attempt to identify the reasons for this. Possible candidates include reduced image charge effects and local electric fields at the surface.

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