

Abstract Submitted
for the DAMOP07 Meeting of
The American Physical Society

Ionization of xenon Rydberg atoms at oxidized Si(100) surfaces¹

DENNIS NEUFELD, HARDIN DUNHAM, JIM LANCASTER, BARRY DUNNING, Rice University, STEPHAN WETHEKAM, Institut für Physik der Humboldt-Universität zu Berlin — The ionization of xenon Rydberg atoms incident at near grazing angles on an oxidized Si(100) surface is being examined. Comparison to earlier measurements at a Au(111) surface suggests that ionization, i.e., electron tunneling, occurs much further from the surface and at atom-surface separations that are physically unreasonable. A number of possible explanations for these observations have been considered including both ion reflection and the presence of stray electric fields at the surface. Model calculations suggest that even relatively small variations in surface potential due, for example, to surface charging can lead to the generation of strong local fields sufficient to field ionize the incident atoms before tunneling occurs. This effect is discussed together with possible applications in the detection of low- n Rydberg atoms.

¹Research supported by the NSF and Robert A. Welch Foundation.

Dennis Neufeld
Rice University

Date submitted: 01 Feb 2007

Electronic form version 1.4