

Abstract Submitted
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The Influence of Stray Fields on the Ionization of Rydberg atoms at Metallic Surfaces¹ DENNIS NEUFELD, YU PU, F. BARRY DUNNING, Rice University — The effect of local surface electric (“patch”) fields on the ionization of xenon Rydberg atoms at metallic surfaces is examined. The patch fields are determined from measurements of the potential variations across the target surfaces using Kelvin probe force microscopy. These measurements are used in conjunction with a simple over-the-barrier model of ionization to predict the surface ionization characteristics for Rydberg atoms with a range of different n and angles of incidence. These predictions are in good agreement with experimental measurements demonstrating the important role that patch fields play during Rydberg atom-surface interactions and suggesting that such interactions can provide a sensitive probe of stray fields at surfaces. These techniques are extended to lithographically patterned structures comprising two sets of interleaved “comb-like” electrodes to which different potentials can be applied. This allows control of the surface patch fields and direct study of their effects.

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