

Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Direct Experimental Observations of a Phase Space Turnstile in a Rydberg System¹ KEVIN MITCHELL, KORANA BURKE, University of California, Merced, SHUZEN YE, BRENDAN WYKER, BARRY DUNNING, Rice University — Rydberg atoms exposed to alternating positive and negative electric field pulses (kicks) are an example of a chaotic atomic system. Chaotic ionization in this system is organized by a phase space turnstile which represents a mechanism that promotes electrons from their bound to unbound state. Only the electrons that are inside the turnstile ionize after one kicking period. We present theoretical and experimental results for the turnstile signature in the chaotic ionization of Rydberg atoms. We create a Rydberg wave packet and subject it to alternating kicks, after which we measure the ionization fraction. The signature of the turnstile manifests itself in the step-function-like behavior of the ionization fraction as a function of the kick strength. We show that this behavior persists for different values of kicking periods and starting electron energies.

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

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Date submitted: 04 Feb 2011

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