Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Ionization of kicked Rydberg atoms via a turnstile mechanism[1]
KORANA BURKE, University of California Merced, KEVIN MITCHELL, University of Califronia Merced, SHUZHEN YE, BRENDAN WYKER, F. BARRY DUNNING, Rice University — We present a theoretical and experimental study of the chaotic of quasi-one-dimensional potassium Rydberg wavepackets via phase space turnstile mechanism. Turnstiles form a general mechanism for numerous chaotic systems, and this study is first to explicitly illuminate their relevance to atomic. We create time-dependent Rydberg wavepackets, subject to alternating applied electric fields (kicks), and measure the fraction. We show that the ionization of the electron not only on the initial electron energy, but also on the phase position of the electron with respect to the turnstile–that of the electron packet inside the turnstile ionizes quickly, one period of the applied field, while that part outside the ionizes after multiple kicking periods. The dependence of ionization on the kicking period can also be understood in terms the turnstile geometry.

[1]This research is supported by the NSF and the Robert A Welch Foundation.

Korana Burke
University of California Merced

Date submitted: 06 Feb 2011 Electronic form version 1.4