Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Transporting near-circular Bohr-like wave packets using chirped pulse trains S. YOSHIDA, J. BURGDÖRFER, Vienna University of Technology, C.O. REINHOLD, Oak Ridge National Laboratory, B. WYKER, S. YE, F.B. DUNNING, Rice University — Protocols for driving localized high-n (n 300) wave packets in near-circular Bohr-like orbits to higher n states using chirped sine waves are described. While Rydberg wave packets involving several n levels are known to be dispersive, circular wave packets can be stabilized by the application of a circularly- or linearly- polarized resonant sine wave. A similar stabilization mechanism is known for the formation of the Trojan asteroids in celestial mechanics. We demonstrate that by slowly chirping the drive frequency parent high-n wave packets can be transported to a narrow distribution of much higher n states because the motion of the wave packet remains locked to the sine wave during the chirping. Use of a chirped HCP train instead of a sine wave allows similar transport but also provides some control of the orbit eccentricity. Research supported by the NSF, the Robert A. Welch Foundation, the OBES US DoE to ORNL, and by the FWF (Austria)

Brendan Wyker
Rice University

Date submitted: 26 Jan 2011 Electronic form version 1.4