

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Creating and transporting Trojan wave packets¹ S. YE, B. WYKER, X. ZHANG, F.B. DUNNING, Rice University, S. YOSHIDA, Vienna University of Technology, C.O. REINHOLD, Oak Ridge National Laboratory, J. BURGDÖRFER, Vienna University of Technology — The non-dispersive localized atomic states that have been most widely studied theoretically are termed Trojan wave packets because the mechanism responsible for suppressing dispersion (which is of classical origin) parallels that for stabilization of Jupiter's Trojan asteroids located near the L_4 and L_5 Lagrange points. In the present work non-dispersive localized Trojan wave packets with $n \sim 305$ moving in near-circular orbits are created in the laboratory, and transported to localized near-circular Trojan states of higher n , $n \sim 600$, by driving with a linearly-polarized sinusoidal electric field whose period is slowly increased. The protocol is remarkably efficient with over 80% of the initial atoms being transferred to the higher n states. The mechanisms involved in localization and transport are discussed with the aid of classical trajectory Monte Carlo simulations.

¹Research supported by the NSF, the Robert A. Welch Foundation, and the FWF (Austria).

Shuzhen Ye
Rice University

Date submitted: 31 Jan 2012

Electronic form version 1.4