

Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Interaction of Wave Packets with an Oscillating Gaussian Barrier

TOMMY BYRD, MEGAN IVORY, A.J. PYLE, SETH AUBIN, JOHN DELOS, Dept. of Physics, College of William and Mary, Williamsburg, VA, KUNAL DAS, Dept. of Physics, Kutztown University, Kutztown, PA, KEVIN MITCHELL, Dept. of Physics, UC Merced, Merced, CA — We use classical, semiclassical, and quantum mechanics to examine a propagating wave packet that encounters an oscillating Gaussian potential barrier. The wave packet can be transmitted, reflected, or partially reflected and partially transmitted. The final wavefunction is constructed both semiclassically and quantum mechanically, and we examine the agreement between these two methods. It is believed that multiple oscillating Gaussian potential barriers may serve as a quantum pumping mechanism for ultracold atoms [1]. We have chosen to study first a simpler case, that of a single oscillating Gaussian barrier, with the intention of using these results for studying cases with multiple barriers.

Tommy Byrd
Dept. of Physics, College of William and Mary, Williamsburg

Date submitted: 31 Jan 2012

Electronic form version 1.4