

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Holy balls!** TADD TRUSCOTT, Brigham Young University, JESSE BELDEN, Naval Undersea Warfare Center — Why can some balls walk on water while others cannot? We investigate the rebound dynamics of elastic spheres impacting on a free-surface. Several variables determine whether or not a sphere will bounce when impacting a free-surface including velocity, impact angle, size and elasticity. Stiff elastic spheres, such as a racquetball, successfully skip at low impact angles and high velocities, but tend not to bounce when the impact angle becomes too large. However, the more compliant Waboba<sup>®</sup> (WATER BOUNCING BALL) bounces marvelously even at very high impact angles. Unlike a stiffer ball, the Waboba<sup>®</sup> flattens out quickly as it is forming a cavity. The cavity lip forms a ramp and the flattened ball then skips off the water surface. We demonstrate how this phenomenon surprisingly resembles a skipping stone. Using high-speed video we explore the rebound dynamics for various values of elasticity, velocity, angle and size and determine when an object will bounce off the water surface.

Tadd Truscott  
Brigham Young University

Date submitted: 15 Aug 2011

Electronic form version 1.4