

Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Coefficient of Restitution in a Vertically Driven Experiment with Two Particles KAI YANG, ALEX SABEY, JEFFREY OLAFSEN, Department of Physics Baylor University — The velocity dependence of the coefficient of restitution (COR) has been investigated both theoretically and experimentally for as few as one bouncing ball to granular gases with thousands of particles. Numerous experiments and simulations have been performed to describe the dependence of the COR on the collision velocity. Here, we present an experimental study of the COR with two identical particles driven vertically in a nearly one-dimensional channel. Rather than prior experiments that seek to constrain the experiment to an ideal one-dimensional collision, the aim here is to examine more freely colliding events that can be filtered for different types of dynamics. Both spherical particles in this experiment are Delrin with a diameter, d , of 5 mm. Multiple sets of data are obtained for frequencies, f , from 26 to 32 Hz and acceleration magnitudes, Γ , from 1.79 to 3.52 g. High speed digital imaging is used to extract the positions and velocities of the two particles from the experiment for analysis. Most of our data suggests that the COR has a linear dependence on the pre-collision velocity, but different behaviors are observed in the low and high collision velocity regimes, respectively.

Jeffrey Olafsen
Baylor University

Date submitted: 31 Jul 2020

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