

Abstract Submitted
for the TSF21 Meeting of
The American Physical Society

Simulation of two particles colliding in a vertically shaken channel KAI YANG, JEFFREY OLAFSEN, Baylor University — Previously, we experimentally studied the dynamics of two particles free to collide in a vertically shaken channel. Here, we present a simulation of the system in an event driven numerical simulation written in IDL to compare with the experimental results. We considered two cases with different values of coefficient of restitution. First, we keep the coefficient of restitution constant with a value of $e=0.9$. Second, we adopted a normal distribution of values for the coefficient of restitution with a mean of 0.9 and a standard deviation $\sigma =0.1$. The same driving frequencies of the experiment, f , ranging from 23 to 32 Hz and the acceleration magnitudes, Γ , from 1.78 to 3.53 g are used. In the case of the normal distributed coefficient of restitution, the dependence on the impact velocity is similar to the experimental results. The dependence of coefficient of restitution on the driving frequency and amplitude are also examined and the results have the same trends with that of the experiment. The simulation enables us to probe the dynamics of the two bouncing particles in a much more thorough way and provides useful insights in understanding both the particle-particle and particle-plate collision processes in the experiment.

Kai Yang
Baylor University

Date submitted: 24 Sep 2021

Electronic form version 1.4