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Normal and Tangential Coefficient of Restitution Measurements in an Inelastic Billiard Experiment JEFFREY OLAFSEN, MARTIN MARTINEZ, Physics Department, Baylor University — Driven granular media generate a large amount of dissipation in their particle-particle and particle-boundary interactions. As such, our understanding of the fundamental dynamics in these systems is complicated by the velocity-dependent nature of the coefficient of restitution of these interactions. Indeed, how a driven granular flow jams also necessitates a better understanding of the details of this dissipative mechanism. A large number of very sophisticated experiments have sought to better understand and predict the velocity dependence of the coefficient of restitution by trying to constrain and control aspects of the particle-particle or particle-boundary collisions. Here, a careful and in-depth analysis from previously published results [1] for an inelastic billiard moving within a confining boundary allows the velocity-dependence to be measured as the dynamics freely evolve over multiple collisions in the driven system. The large amount of data generated in this experiment allows the contributions from both the normal and tangential velocity components in the particle-boundary interactions to be examined. Two derivative experiments, one for particle-boundary and the other for particle-particle collisions will also be discussed.

[1] S. Feldt and J.S. Olafsen. "Inelastic Gravitational Billiards." *Physical Review Letters* (2005): 224102.

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