Measurements of Granular Tribocharging by High-Speed Videography

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***Abstract*—Triboelectric charge exchange between individual dielectric grains during collision is poorly understood, due to the difficulties associated with isolating particle-particle interactions from interactions with the atmosphere, container, and measurement device. We have developed a method for inducing and measuring particle-particle charge exchange in mixtures of dielectric grains in a high-vacuum environment, based on the setup by Waitukaitis and Jaeger at the University of Chicago. A granular mixture is agitated in vacuum, causing collisions between grains, and the grains are filmed as they fall through an electric field. The observed deflection and size of the grains can be used to construct a profile of the charge distribution in the granular mixture, as a function of grain size. These results enable a better understanding of the underlying mechanism of charge exchange, including ways to predict and manipulate charge distributions to achieve a desired outcome. We will describe the experimental apparatus that we have constructed and present the results of our first measurements.**