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**Cluster Formation in a Freely-Falling Granular Stream** ALISON KOSER, Kutztown University of Pennsylvania, JOHN R. ROYER, SCOTT R. WAITUKAITIS, HEINRICH M. JAEGER, Univ. of Chicago — Granular materials do not conform to traditional phases of matter, appearing as solid, liquid, or gas, with virtually no change to the properties of its particles. One liquid behavior that grains mimic is the break-up and formations of clusters in a freely-falling stream of matter. Previous work [Royer et al, *Nature* **459** 1110-1113 (2009)] contributed clustering to a small cohesive force between particles that is much less than the surface tension in liquids. Here, the role of the nozzle diameter and particle diameter are examined in the act of forming granular clusters. Break-up distance, cluster width, and aspect ratio were measured and compared to liquid break-up. For systems that cluster, we find similar but different trends between the liquid and granular cases which surface tension alone cannot explain.

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