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Impact of a hydrophobic granular stream in water[1] BRIAN UTTER, Bucknell University, HARRY MANDELES, JACOB PARKHOUSE, James Madison University — We experimentally investigate the flow of a stream of hydrophobic granular particles impacting a water surface from above. The granular sample is composed of a mixture of hydrophobic and hydrophilic grains and the concentration, stream diameter, and drop height are independently controlled. While granular flows are common in nature and industry, effects of surface chemistry on flow behavior have received relatively little attention. The present experiment complements rheological measurements performed in parallel and aims to elucidate prior experiments on hydrophobic samples in a rotating drum. The present experimental geometry allows us to compare the behavior of granular streams to prior work on impacts of solids and fluid streams. Sequential images of the granular stream in water are taken and analyzed. We present data on the size, length, and shape of the aggregate streams with variations in concentration, entering stream diameter, and drop height. We find that increased hydrophobic grain concentration leads to increased aggregation due to an effectively cohesive interaction mediated by entrained air. At lower concentrations, the stream exhibits a lateral instability. Finally, we will make connections to rheology and rotating drum results.

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Brian Utter
Bucknell University

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