

Abstract Submitted  
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**Dynamics angle and surface flow properties of wet and cohesive granular matter** QING XU, ARSHAD KUDROLLI, Physics Dept., Clark University — We will discuss an experimental study of the flow of grains mixed with a small amount of liquid using a horizontally rotated drum apparatus, extending on our previous work on the maximum angle of stability of wet granular materials [1]. We focus on the continuous avalanching regime observed at high rotation rates, and examine the shape of the granular surface and depth of flow with imaging techniques as a function of amount, viscosity and surface tension of the liquid. Glass beads with 1mm diameter, and a drum with a diameter 295 mm and a width of 145mm is used to minimize the effect of the boundary. We find that the shape of the surface may be approximated by two linear segments in the upper and lower halves. The slope of the upper segment corresponding to the dynamical angle of repose  $\theta_d$  is observed to initially increase with rotation rate and volume fraction of liquid as expected, while the lower segment has an approximately constant slope. Interestingly,  $\theta_d$  is observed to peak before decreasing to an approximately constant value as the volume fraction is increased. The rate of increase of  $\theta_d$  is observed to decrease with rotation rate and viscosity. The role of the time scale over which wet grains shear past each other and the time over which grains actually come into contact due to lubrication forces on the observed change in scaling will be discussed.

[1]: S. Nowak, A. Samadani, and A. Kudrolli, *Nature Physics* **1**, 50 (2005).

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