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Packing Fraction and Maximum Stability Angle of Granular Heaps JEREMY OLSON, MARQUITA PRIESTER, JIN-YING LUO, SAMEER CHOPRA, RENA ZIEVE, University of California, Davis — From rotating drum measurements in two dimensions, we show that the packing fraction of a granular heap plays a dual role in predicting its stability. For a fixed grain shape, the stability increases with packing fraction. We have measured this effect for several grain shapes. However, in determining the relative stability of different grain shapes, those with the *lowest* average packing fractions tend to have the highest maximum angle of stability. A possible explanation is that a low packing fraction indicates that a heap can support a wide range of stable configurations. With more stable arrangements available, the heap has to be tilted farther, on average, to reach an unstable configuration that triggers an avalanche. We also find a lack of correlation between angles of successive avalanches. This shows that only the grain arrangement close to the surface of the pile, which changes from one avalanche to the next, figures prominently in triggering the avalanches.

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