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Effects of Cohesion On the Dynamic Response of A Conical Bead Pile PAROMA PALCHOUDHURI, SUSAN LEHMAN, D.T. JACOBS, Department of Physics, College of Wooster, Wooster, OH — We investigate the critical behavior of a 3D conical bead pile built from uniform 3 mm steel spheres. The pile is initially built on a circular base and is subsequently slowly driven through the addition of one bead at a time to the apex of the pile. We investigate the dynamic response of the pile by recording avalanches from the pile over the course of tens of thousands of bead drops, and determining the resulting distribution of avalanche size. In previous work, we have shown that dropping the beads onto the pile from a greater height causes the distribution to deviate from a simple power law due to a stark reduction in number of the largest avalanches. By placing the pile in a uniform magnetic field, we are now observing changes in the avalanche size distribution due to cohesion. When there is cohesion between beads, we find an increase in probability for the largest avalanches and a strong decrease in the probability of medium-sized avalanches. We also observe an increase in the time between avalanches as the cohesion of the system increases. Preliminary results on the effect of simultaneously increasing cohesion, which tends to make large avalanches more probable, and increasing drop height, which tends to make large avalanches less probable, will also be presented.

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