Abstract Submitted
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Experimental Study of the 2D Jamming Transition XIANG CHENG, The University of Chicago — We can study a jammed system of particles by following a loosely-packed configuration as the individual particles increase their size until all the particles are constrained by their neighbors. Because tapioca pearls swell to over twice their initial diameter when submerged in water, they offer an ideal medium with which to study properties of the jamming transition in the presence of frictional interactions. Using an array of $\sim$ 10,000 tapioca pearls, we study several static and dynamic signatures of the two-dimensional jamming transition. The amplitude of the first peak of the pair-correlation function changes non-monotonically as the packing fraction of the system increases. This is consistent with recent experiments in a colloidal system of NIPA particles at finite temperatures [1]. This signature is a vestige of the divergence of this peak in the frictionless-sphere limit [2]. A length scale, defined by the spatial velocity correlation function, and the number hexagons in the Voronoi tessellation have pronounced maxima at the transition. [1] Z. Zhang, D. T. N. Chen, A. G. Yodh, K. B. Aptowicz and P. Habdas, Bull. Am. Phys. Soc. Volume 53, Number 2 (2008). [2] C. S. O'Hern, L. E. Silbert, A. J. Liu and S. R. Nagel, Phys. Rev. E 68, 011306 1-19 (2003).

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