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Stability of Packings of Soft Elliptical Grains in 2D¹ MITCHELL MAILMAN, BULBUL CHAKRABORTY, Brandeis University, CARL SCHRECK, COREY O'HERN, Yale University — Simulations of hard ellipse packings show that these ellipse packings are generally hypostatic. By using a dynamical matrix approach to analyzing the stability of two-dimensional ellipse packings, we show that the degree of hypostaticity is related to the fraction of zero-frequency modes. The packings are generated using a compression protocol previously employed in disk packings and an energy function based on the overlap model developed by Perram and Wertheim. The density of states exhibits a low frequency peak that approaches zero as the compression is reduced. There is a gap separating this peak from the higher frequency modes. In this talk, we will demonstrate the existence of a scaling relation between the vibrational spectra at different aspect ratios. We will also discuss the origin of the low frequency modes and the origin of the scaling. Analysis of the relationship between contact numbers and vibrational modes will be used to compare and contrast the jamming transition in disks and ellipses.

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