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Emergence of a critical scale in jamming of frictional grains ELLAK SOMFAI, University of Leiden and University of Oxford, MARTIN VAN HECKE, WOUTER ELLENBROEK, WIM VAN SAARLOOS, University of Leiden — We probe the characteristic scale of two-dimensional frictional granular media close to the jamming transition by studying their vibrational properties as function of the applied pressure P and friction coefficient μ . The density of vibrational states exhibits a crossover from a plateau at frequencies $\omega > \omega^*(P, \mu)$ to a linear growth for $\omega < \omega^*(P, \mu)$. Both for large and for zero friction, this characteristic frequency ω^* vanishes when P is lowered towards zero. For moderate friction, however, ω^* saturates at a finite value for $P \downarrow 0$. We show that ω^* is proportional with Δz , the excess number of contacts per grains relative to the minimally allowed, isostatic value, and that only for zero and infinitely large friction, systems at the jamming threshold have $\Delta z \rightarrow 0$ and hence are critical.

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