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Shaking into order

We join the theories that describe the orientation, treated as a tensor, of liquid crystals and the agitation of inelastic grains to obtain a mathematical model of non-spherical particles contained in a quasi-2D square box and driven into dissipative collisions through the vibration of two of the four flat walls, in the absence of gravity and mean flow. The particle agitation induces spatial inhomogeneities in the density and the isotropic–nematic transition to take place somewhere inside the box, if the particle shape is sufficiently far from spherical. We show quantitative agreement between the theory and discrete numerical simulations of ellipsoids of different length-to-diameter ratio. We need to fit two dimensionless parameters that were not previously available or determined in different configurations. These parameters, of order unity and weakly dependent on the shape of the particles, are indicative of the resistance to alignment distortion associated with entropic elasticity.