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**Dynamics of an acoustically levitated granular fluid** MELODY LIM, BRYAN VANSADERS, James Franck Institute, University of Chicago , ANTON SOUSLOV, Department of Physics, University of Bath, VINCENZO VITELLI, HEINRICH JAEGER, James Franck Institute, University of Chicago — Macroscopic particles in an acoustic trap can self-assemble into single layer close-packed granular rafts consisting of hundreds of particles. These rafts are formed and stabilised due to a sonic depletion force mediated by scattering, which establishes attractive forces between the constituent particles. We show that this cohesive, quasi-2D granular material displays fluid-like behaviour, forming circular granular droplets with an emergent surface tension and viscosity. Beyond cohesion, the acoustic field also induces forces and torques that drive the droplets to merge, deform, and break-up. We focus on a persistent acoustic torque that increases the angular momentum of objects in the acoustic field. As the angular momentum of a granular droplet is increased, it deforms from a circle to an ellipse, eventually pinching off into multiple separate droplets. We use hydrodynamic models for rotating liquid drops to describe the granular dynamics and extract the droplet surface tension.

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