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Synchronous droplets as a test bed for pulsatory active fluids GEORGIOS KATSIKIS, MANU PRAKASH, Stanford University — Collective behavior in many-body systems has been studied extensively focusing on a wide range of interacting entities including: flocking animals, sedimenting particles and microfluidic droplets among others. Here, we propose an experimental platform to explore an oscillatory active fluid with synchronous ferrofluid droplets immersed in an immiscible carrier fluid in a Hele-Shaw configuration. The droplets are organized and actuated on a 2-D uniform grid through application of a precessive magnetic field. The state of our system is dependent on three parameters: the grid occupancy with fluid droplets, the grid geometry and the magnetic field. We study the long range orientational order of our system over a range of those parameters by tracking the motion of the droplets and analyzing the PIV data of the carrier fluid flow. Numerical simulations are juxtaposed with experimental data for prediction of the system's behavior.

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