

Abstract Submitted  
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**Spontaneous Oscillations in an Active Matter System** ROBERT HAYES, BOYCE TSANG, University of Illinois, STEVE GRANICK, IBS Center for Soft Living Matter and UNIST — Active matter (which consumes energy to move about) can organize into dynamic structures more interesting than those possible at steady-state. Here we show spontaneous periodic self-assembly in a simple three-component system of water, oil phase, and surfactant at constant room temperature, with emphasis on one model system. Benchtop experiments show that liquid crystal oil droplets spontaneously and collectively oscillate like a ‘beating heart’ for several hours; contract, relax, and subsequently re-contract in a petri dish at a rate of a few ‘beats’ per minute. These oscillations, emergent from the cooperative interaction of the three components, are driven by the competition between positive and negative feedback processes. This illustration of feedback in action reveals a new way to program self-assembled structures to vary with time.

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