

Abstract Submitted
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Long-lived "critters" formed by hydrodynamic clustering BLAISE DELMOTTE, Courant Institute, NYU, MICHELLE DRISCOLL, NYU Physics, MENA YOUSSEF, STEFANO SACANNA, NYU Chemistry, ALEKSANDAR DONEV, Courant Institute, NYU, PAUL CHAIKIN, NYU Physics — Self-assembly in colloidal systems often requires finely tuning the interactions between particles. When colloids are active, or moving due to an external drive, the assembly is even harder to achieve. Here we show that long-lived compact motile structures, called "critters", can be formed just with hydrodynamic interactions. They naturally emerge from a recently discovered fingering instability in a system of microrollers near a floor. Our 3D large-scale simulations show that these critters are a stable state of the system, move much faster than individual rollers, and quickly respond to a changing drive. The formation of critters is robust to any initial condition and our experiments suggest that similar structures are formed even in a thermal colloidal system. We believe the critters are a promising tool for microscopic transport, flow, aggregation and mixing.

Blaise Delmotte
Courant Institute, New York University

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