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Confining collective motion DENIS BARTOLO, ENS Lyon, ANTOINE BRICARD, ESPCI and ENS Lyon, JEAN-BAPTISTE CAUSSIN, CHARLES SAVOIE, ENS Lyon, DEBASISH DAS, UCSD, OLESKAR CHEPIZHKO, FERNANDO PERUANI, Université de Nice, DAVID SAINTILLAN, UCSD — It is well established that geometrical confinement have a significant impact on the structure and the flow properties of complex fluids. Prominent examples include the formation of topological defects in liquid crystals, and the flow instabilities of viscoelastic fluids in curved geometries. In striking contrast very little is known about the macroscopic behavior of confined active fluids. In this talk we show how to motorize plastic colloidal beads and turn them into self-propelled particles. Using microfluidic geometries we demonstrate how confinement impacts their collective motion. Combining quantitative experiments, analytical theory and numerical simulations we show how a population of motile bodies interacting via alignement and repulsive interactions self-organizes into a single heterogeneous macroscopic vortex that lives on the verge of a phase separation.

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