

Abstract Submitted  
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**Collective motion in populations of colloidal robots** DENIS BARTOLO, ENS Lyon, ANTOINE BRICARD, ESPCI, JEAN-BAPTISTE CAUSSIN, ENS Lyon, OLIVIER DAUCHOT, NICOLAS DESREUMAUX, ESPCI — Could the behavior of bacteria swarms, fish schools, and bird flocks be understood within a unified framework? Can one ignore the very details of the interaction mechanisms at the individual level to elucidate how strikingly similar collective motion emerges at the group level in this broad range of motile systems? These seemingly provocative questions have triggered significant advance in the physics and the biology, communities over the last decade. In the physics language these systems, made of motile individuals, can all be thought as different realizations of “active matter.” In this talk, I will show how to gain more insight into this vivid field using self-propelled colloids as a proxy for motile organism. I will show how to motorize colloidal particles capable of sensing the orientation of their neighbors. Then, I will demonstrate that these archetypal populations display spontaneous transitions to swarming motion, and to global directed motion with very few density and orientation fluctuations.

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