

Abstract Submitted  
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**Emergence of collective motion in a model of interacting passive Brownian particles**<sup>1</sup> VICTOR DOSSETTI, Instituto de Fisica, Benemerita Universidad Autonoma de Puebla, Apdo. Postal J-48, Puebla 72570, Mexico, FRANCISCO J. SEVILLA, ALEXANDRO HEIBLUM-ROBLES, Instituto de Fisica, Universidad Nacional Autonoma de Mexico, Apdo. Postal 20-364, 01000, Mexico D.F., Mexico — In this work, we show that the state of a system of passive Brownian (non-self-propelled) particles interacting only through a social-like force (velocity alignment in this case), goes from stationary phases in thermal equilibrium with no net flux of particles, to far-from-equilibrium phases exhibiting collective motion. The mechanism that leads to the instability of the equilibrium phases relies on the competition between two time scales, namely, the mean collision time of a Brownian particle in a thermal bath and the time it takes for a particle to orient its direction of motion along the direction of motion of its neighbors.

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