Intermittency and ergodicity breaking in a system of interacting self-propelled particles

FRANCISCO J. SEVILLA, Instituto de Física, Universidad Nacional Autónoma de México, VICTOR DOSSETTI, Instituto de Física, Benemerita Universidad Autónoma de Puebla — A comprehensive dynamical model for cooperative motion of self-propelled particles [Dossetti et al. Phys. Rev. E 79, 051115 (2009)], that combines velocity alignment interactions, spatial interactions, and angular noise, is studied. The noise considered in this model comes about nonlinear with correlations that decay in time, leading to a unique collective behavior. In particular, for a certain arrangement of the parameters, the system develops intermittent behavior and some sort of ergodicity breaking. In this work, we characterize these phenomena by studying the distributions of time intervals between turbulent bursts and changes between metastable states, respectively.

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