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Dynamic Clustering in Suspension of Motile Bacteria HEPENG ZHANG, XIAO CHEN, XIANG YANG, Shanghai Jiao Tong Univ, China, MINGCHENG YANG, Beijing National Laboratory for Condensed Matter Physics and Key Laboratory of Soft Matter Physics, Institute of Physics, Chinese Academy
— Bacteria suspension exhibits a wide range of collective phenomena arising from interactions between individual cells. Here we investigate dynamic clusters of motile bacteria near an air-liquid interface. Cell in a cluster orient its flagella perpendicular to the interface and generate attractive radial fluid flow that leads to cluster formation. Rotating cell also creates tangential forces on neighbors that sets clusters into counter-clockwise rotation. We construct a numerical model of self-propelled particles that interact via pair-wise forces extracted from hydrodynamic calculations; such a model reproduces many properties of observed cluster dynamics.

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