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**Orientational order in two-dimensional confined active suspensions** ALAN CHENG HOU TSANG, EVA KANSO, University of Southern California — Geometric confinement in physical space is important for the studies of the collective motion of active suspensions. The reasons are two-fold: motile biological micro-organisms or active collides are always subject to different types of confinement in their swimming environment; The existence of confinement can significantly affects hydrodynamic interactions between the swimmers and thus changes the nature of collective motion. We focus on the situation when the swimmers are confined between two parallel plates such that the motion of the particles are restricted to two dimensions. In this case, the far-field hydrodynamic effect of a swimmer is no longer given by a force-dipole, which has been used in numerous studies on discrete numerical simulations and continuum theories. Instead, the far-field effect of a confined swimmer is given by a potential-dipole. Using a potential-dipole model in doubly-periodic domain, we perform numerical simulations to probe into the collective dynamics of confined active suspensions. We show that isotropic suspensions of swimmers are unstable and develop long time polar orientation order. This results in coherent clusters swimming in the same direction, reminiscent to the collective behavior usually observed in phenomenological models.

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