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Density fluctuations and topological structures in collective surface motion of microswimmers TONG GAO, MICHAEL SHELLEY, Courant Institute of Mathematical Sciences — Active matter that consists of self-propelled particles, such as bacterial suspensions and assays of self-driven biofilaments, can exhibit collective motions with large-scale complex flows and topological defect dynamics. Using a Doi-Onsager kinetic theory, we study suspensions of microswimmers confined to an air/liquid interface, and identify correlations between particle density fluctuations, defect structures, nematic order, and surface flows. When considering a free-standing liquid film where the microswimmers are distributed on the air/liquid interfaces, we capture hydrodynamic coupling of the two active surface, characterized by synchronization of motile disclination defects. We estimate the effective "penetration distance" between the two coupled surfaces through a linear stability analysis.

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