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Transport and collective dynamics in suspensions of swimming particles MICHAEL GRAHAM, JUAN HERNANDEZ, Univ. of Wisconsin-Madison — Direct simulations of large populations of hydrodynamically interacting swimming particles at low Reynolds number are performed. Hydrodynamic coupling between the swimmers leads to large-scale coherent vortex motions in the flow that are consistent with experimental observations. At low concentrations, swimmers propelled from behind (like spermatazoa) strongly migrate toward solid surfaces in agreement with simple theoretical considerations; at higher concentrations this localization is disrupted by the large-scale coherent motions. Correspondingly, at large concentrations the swimmers move with velocities several times larger than they could achieve in isolation.

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