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Individual and collective dynamics of gyrotactic algae SUJOY GANGULY, CRISTIAN SOLARI, JOHN KESSLER, RAYMOND GOLDSTEIN, University of Arizona — When a swimming microorganism has an anistropic distribution of mass, rotational drag due to shear can strongly affect the orientation of its swimming trajectories. *Gyrotaxis* is motility guided by this combination of torques. An important example is provided by upward swimming of slightly negatively buoyant organisms, which results in unstable density stratification in the fluid, then descending curtains that become plumes and bioconvection patterns. The details of these self-concentrative dynamics are determined by gyrotaxis and the associated flows. We report novel experiments on the development of these instabilities, their eventual settling into steady states or, occasionally, secondary dynamical instabilities. Details of the collectively generated flow fields were obtained using PIV, Particle Imaging Velocimetry. The implications of self-generated flow fields with large Peclet numbers are discussed.

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