Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

High-fidelity phototaxis in biflagellate algae KYRIACOS LEPTOS, MAURIZIO CHIOCCIOLI, SILVANO FURLAN, ADRIANA PESCI, RAYMOND GOLDSTEIN, DAMTP, University of Cambridge — The single-cell alga *Chlamydomonas reinhardtii* is a motile biflagellate that can swim towards light for its photosynthetic requirements, a behavior referred to as phototaxis. The cell responds upon light stimulation through its rudimentary eye – the eyespot – by changing the beating amplitude of its two flagella accordingly – a process called the photoresponse. All this occurs in a coordinated fashion as *Chlamydomonas* spins about its body axis while swimming, thus experiencing oscillating intensities of light. We use high-speed video microscopy to measure the flagellar dynamics of the photoresponse on immobilized cells and interpret the results with a mathematical model of adaptation similar to that used previously for *Volvox*. These results are incorporated into a model of phototactic steering to yield trajectories that are compared to those obtained by three-dimensional tracking. Implications of these results for the evolution of multicellularity in the Volvocales are discussed.

Raymond Goldstein
Univ of Cambridge

Date submitted: 01 Aug 2015 Electronic form version 1.4