Abstract Submitted
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Observation of Flow-Induced Synchronization of Eukaryotic Flagella[1] M. POLIN, I. TUVAL, K. DRESCHER, R.E. GOLDSTEIN, University of Cambridge — Colonial algae serve as model organisms for the study of evolutionary transitions to multicellularity, with species ranging from unicellular *Chlamydomonas* to *Volvox*, with thousands of biflagellated somatic cells. Locomotion and phototaxis of the multicellular species depends on the degree of coordination among those flagella, but little quantitative information has been available on the nature and degree of their spatio- temporal organization. Taking advantage of the spherical organism geometry, novel micromanipulation techniques, and high-speed imaging, we quantify in *V. carteri* the complex temporal dynamics of the flagella of individual somatic cells and the correlations of beat plane and beat phase between nearby cells. These flagella display the phenomenon of rhythm-splitting, well-known in the dynamics of coupled oscillators, and external flow is shown to strongly modify the degree of synchronization of flagella pairs.

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