Abstract Submitted
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Spontaneous transitions in the synchronisation states of a Chlamydomonas mutant KIRSTY WAN, KYRIACOS LEPTOS, MARCO POLIN, University of Cambridge, IDAN TUVAL, IMEDEA, Mallorca, Spain, RAYMOND GOLDSTEIN, University of Cambridge — The mechanisms by which eukaryotic flagella are found to synchronise is poorly understood; the origins being dependent upon the hydrodynamics, as well as the underlying molecular biochemistry. Exemplifying how available phenotypic variations in a species may be exploited to extend our mathematical models for flagellar coupling, we turn to ptx1 - a non-phototactic mutant strain of the biflagellated alga *Chlamydomonas* with seemingly intact flagellar apparatus, which does not exhibit any gross motility defects. Intriguingly however, our high-speed imaging analysis of flagellar dynamics in ptx1 have revealed that rather unlike their wildtype predecessors, which beat mostly in synchrony interrupted by brief periods of drifts or slip [1], the two flagella of ptx1 are observed to consistently revert from synchrony to a state of stable, coupled, anti-phase beating dynamics. Incorporating the interpretation of the flagella pair as coupled noisy oscillators, we show how such behaviour corroborates readily with a secondary contribution to the coupling, which is further conjectured to be inherent in the wildtype.
[1] Polin M et al. *Science*, 487-490, **2009**.

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