

Abstract Submitted  
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**Forewing-hindwing phase-lag effect in the propulsive performance of a four-winged flapping flyer**<sup>1</sup> MARIANA CENTENO<sup>2</sup>, PMMH UMR7636 CNRS, ESPCI ParisTech, UPMC (Paris 6), U. Paris Diderot (Paris 7) and Facultad de Ciencias, UNAM, DANIEL PRADAL, BENJAMIN THIRIA, RAMIRO GODOY-DIANA, PMMH UMR7636 CNRS, ESPCI ParisTech, UPMC (Paris 6), U. Paris Diderot (Paris 7) — We study experimentally a four-winged flapping flyer with chord-wise flexible wings in a self-propelled configuration. For a given physical configuration of the flyer (i.e. fixed distance between the forewing and hindwing pairs and fixed wing flexibility), we explore the kinematic parameter space constituted by the flapping frequency and the forewing-hindwing phase lag. Net thrust force, cruising speed and consumed electric power measurements were performed for each point in the  $(f, \varphi)$  parameter space. These results are analyzed in parallel with two-dimensional velocity field measurements obtained by time-resolved particle image velocimetry around a forewing-hindwing pair.

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