

Abstract Submitted
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Wing compliance in self-propelled flapping flyers¹ SOPHIE RAMANANARIVO, BENJAMIN THIRIA, RAMIRO GODOY-DIANA, PMMH UMR7636 CNRS; ESPCI ParisTech; UPMC; Université Paris Diderot — Wing flexibility governs the flying performance of flapping wing flyers. Here we use the self-propelled flapping-wing model mounted on a “merry-go-round” described by Thiria and Godoy-Diana (Phys. Rev. E 82, 015303, 2010) to investigate the effect of chordwise wing compliance on the propulsive performance of the system. The bending of the wings, which is driven mainly by wing inertia in the present experiments, redistributes the aerodynamic forces engendered by the flapping motion and improves the efficiency of the system for a wide range of wing flexibilities and flapping frequencies. A detailed analysis of the phase dynamics between the leading and trailing edges of the wings allows us to pinpoint the mechanisms that limit the beneficial effect of wing compliance.

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