

Abstract Submitted
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Influence of wing tip morphology on vortex dynamics of flapping flight SWATHI KRISHNA, KAREN MULLENERS, Leibniz Universitaet Hannover — The mechanism of flapping wing flight provides insects with extraordinary flight capabilities. The uniquely shaped wing tips give insects an edge in flight performance and the interaction between the leading edge vortices and wing tip vortices enhance their propelling efficiencies and manoeuvrability. These are qualities that are sought after in current-day Micro Air Vehicles. A detailed understanding of the vortex dynamics of flapping flight and the influence of the wing tip planform is imperative for technical application. An experimental study is conducted to investigate the effects of different wing tip planforms on the formation, evolution and interaction of vortical structures. We thereby focus on the interaction between the coherent structures evolving from the leading edge and the wing tip during pitching and flapping motions. The spatial and temporal evolution of the three-dimensional flow structures are determined using Scanning (Stereo) Particle Image Velocimetry and an in-depth coherent structure analysis. By comparing the vortex dynamics, the aerodynamic performance of various wing tip planforms are evaluated.

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