

Abstract Submitted
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Role of Wing/Body Flexibility in Insect Maneuver¹ CHENGYU LI, HAIBO DONG, SAMANE ZEYGHAMI, Wright State University, FLOW SIMULATION RESEARCH GROUP(FSRG) TEAM — It's widely thought insects are able to accomplish fast maneuver via adjustment of wing kinematics. However, it's still unclear how wing flexibility plays roles in this process. In this work, an integrated study combining high-speed photogrammetry and direct numerical simulation (DNS), for a freely flying dragonfly (*Erythemis Simplicicollis*) in 110 degree turn, is used to reveal both aerodynamic and dynamic roles of its body and wings. Quantitative measurements have shown the significant difference of deformation between all wings as well as up to 18 degree bending of the tail. Unsteady 3D vortex formation and associated aerodynamic forces calculated from high-fidelity simulations are used to illustrate how the turn is accomplished within three dragonfly wing beats. This work is supported by NSF CBET-1055949.

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