

Solving a Dragonfly Flight Mystery

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Dragonflies adjust their wing motion while hovering to conserve energy, according to a Cornell University study of the insect's flight mechanics. The revelation contradicts previous speculation that the change in wing motion served to enhance vertical lift.

The Cornell physicists came to their conclusions after analyzing high speed images of dragonflies in action. The insects have two pairs of wings, which sometimes move up and down in harmony. At other times the front set of wings flap out of sync with the back set.

The physicists found that dragonflies maximized their lift, when accelerating or taking off from a perch, by flapping both sets of wings together. When they hover, however, the rear wings flap at the same rate as the front, but with a different phase (imagine two people clapping at the same speed, but with one person's clap delayed relative to the other).

The physicists' analysis of the out-of-sync motion showed that while it didn't help with lift, it minimized the amount of power they had to expend to stay airborne, allowing them to conserve energy while hovering in place.

Citation: Z. Jane Wang and David Russell, *Physical Review Letters*, forthcoming article

Source: American Physical Society

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