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At the scale of insects flapping flight can be more efficient than fixed wing flight UMBERTO PESAVENTO, Z. JANE WANG, Cornell University, Department of Theoretical and Applied Mechanics — A typical fruitfly supports a weight of 1 mg by flapping a pair of wings of radius $r \approx 0.2$ cm, and mean chord $\bar{c} \approx 6.8 \times 10^{-2}$ cm. The flow around its flapping wings has a Reynolds number of about 100. Recent studies showed that at such Reynolds number an insect can take advantage of unsteady effects to enhance lift production. Here we find that it can also take advantage of these unsteady effects to be more efficient than a classical fixed-wing supporting the same weight.

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