Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Modulation of a Flow Field by Dragonfly Nymph Valve Kinematics[1] CHRIS ROH, MORTEZA GHARIB, California Institute of Technology — Previously, we visualized a respiratory jet and a propulsive jet of a dragonfly nymph using laser induced fluorescence. A more quantitative measurement of the dragonfly nymph's underwater breathing was investigated using digital particle image velocimetry. Simultaneously, dragonfly's anal valve kinematics were recorded using high-speed videography. The result shows an active usage of the valve during exhalation and inhalation to modulate the flow field. Calculating a Lagrangian particle path by time integration of the velocity field showed that the exhaled fluid is not inhaled back. This result suggests that the anal valve modulation of the flow field prevents the rebreathing of the exhaled jet.

[1]Supported by NSF-GRFP

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Date submitted: 31 Jul 2014 Electronic form version 1.4