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High Speed Tomographic PIV Measurements of Copepod Escape Jumps D.R. WEBSTER, D.W. MURPHY, J. YEN, Georgia Tech — Copepods flee from predators via high-acceleration escape jumps that may reach speeds of up to 500 body lengths per second, i.e., relative speeds that are not reached by any other organism. We present time-resolved tomographic PIV measurements of the flow around an escaping calanoid copepod (*Calanus finmarchicus*). Persistent body and wake vortices are created by the impulsive momentum transfer to the fluid surrounding the animal. It is shown that an impulsive stresslet model better describes the flow than an impulsive Stokeslet. Azimuthal asymmetry of the strength and position of the wake vortex is analyzed and attributed to the strong ventral flows created by the metachronally beating swimming legs and to yawing of the body. In addition, the energy required by a copepod escape jump is estimated by calculating the viscous energy dissipation rate using the spatial gradients of the measured three-dimensional velocity field. Finally, the three-dimensional flow measurements are compared to previous axisymmetric CFD simulations.

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