

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Role of Flexibility in Thrust Production of a Mechanical Swimming Lamprey MEGAN LEFTWICH, ALEXANDER SMITS, Princeton University — To develop a comprehensive model of lamprey locomotion, we use a robotic lamprey as a means of investigating the wake structure during swimming with an anatomically designed tail of varying degrees of flexibility. A programmable micro-computer actuates 11 servomotors that produce a traveling wave along the length of the lamprey body. The waveform is based on kinematic studies of living lamprey. The shape of the tail is taken from CT scan data of the silver lamprey, and it is constructed of flexible PVC gel. Plastic inserts allow the the degree of flexibility to be changed. PIV measurements in the wake behind the most flexible tail show a 2P wake structure that quickly loses coherence as it is convected downstream. This is in contrast to the strongly coherent and symmetrical 2P wake seen in previous experiments using a rigid, rectangular tail. The project is supported by NIH CNRS Grant 1R01NS054271.

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Date submitted: 28 Jul 2009

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