Abstract Submitted for the DFD19 Meeting of The American Physical Society

Thrust generation of fish-fin geometries in continuous rotation EMMA JAMIN, CECILIA HUERTAS-CERDEIRA, MORTEZA GHARIB, California Institute of Technology — Fish are known to use flapping motions of their caudal fins to propel, while man-made propellers commonly use continuous motion to achieve thrust. It is not known if fish use the flapping due to its limited range of motion or if it is the most effective way to maneuver in the water. The objective of this work is to analyze the propulsive performance of propeller geometries similar to those of fish fins when performing continuous rotary motions. Because caudal fins possess distinctive morphologies and stiffnesses adapted to the fishs specific modes of life, varying geometries and compliances have been considered. In order to evaluate the thrust generation properties of these fins, an underwater vehicle capable of generating continuous rotation and equipped with exchangeable propellers has been built and tested in a water tunnel. The thrust forces generated by the different fins are presented and compared.

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Date submitted: 31 Jul 2019

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