Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Propulsion via flexibility in shear-thinning fluids[1] KE QIN, Santa Clara University, ZHIWEI PENG, California Institute of Technology, HERVE NGANGUIA, Indiana University of Pennsylvania, YE CHEN, ON SHUN PAK, Santa Clara University — In the low Reynolds number regime, flexibility can be exploited to enable propulsion via the interaction of an elastic body and its surrounding fluid. Biological fluids such as blood and mucus are typically shear-thinning. However, the impact of this ubiquitous non-Newtonian rheology on elastohydrodynamic propulsion remains largely unknown. Here we consider a minimal model to examine how shear-thinning viscosity could modify the fluid-structure interaction and hence the propulsion performance. The results may be useful for the design of artificial micro-propellers in biological fluids.

[1]Supported by the National Science Foundation (NSF) Grants 1830958 and 1931292

Ke Qin
Santa Clara University

Date submitted: 10 Aug 2020 Electronic form version 1.4