

Abstract Submitted  
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**Fluid elasticity enhances the locomotion of multi-tail swimmers**

F.A. GODINEZ, S. GOMEZ, R. ZENIT, Universidad Nacional Autonoma de Mexico, E. LAUGA, University of Cambridge — We conducted experiments on the locomotion of magnetic robots with multiple rigid flagella to evaluate the impact of fluid viscoelasticity on their swimming performance. Each swimmer was composed of a air-filled cylindrical head with a permanent magnet attached at one of its ends. At the other end, two or more rigid helices were glued on the outer surface of the cylinder maintaining the same distance from each other along the periphery and remaining parallel to the rotation axis. The robots were driven by an external magnetic field allowing to vary the swimming speed. Each swimmer was tested in two different fluids with the same shear viscosity: a Newtonian and a Boger fluid. The single-flagellum device showed essentially the same velocity in both fluids. In contrast, multi-flagella robots swam in the Boger fluid at much higher speeds than in the equivalent Newtonian case. These results are discussed in the last of past similar studies.

Roberto Zenit  
Universidad Nacional Autonoma de Mexico

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