Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

An elastic two-sphere swimmer in Stokes flow BABAK NASOURI, GWYNN ELFRING, University of British Columbia — Swimming at low Reynolds number in Newtonian fluids is only possible through non-reciprocal body deformations due to the kinematic reversibility of the Stokes equations. We consider here a model swimmer consisting of two linked spheres, wherein one sphere is rigid and the other an incompressible neo-Hookean solid. The two spheres are connected by a rod which changes its length periodically. We show that the deformations of the body are non-reciprocal despite the reversible actuation and hence, the elastic two-sphere swimmer propels forward. Our results indicate that even weak elastic deformations of a body can qualitatively alter swimming dynamics and should not be neglected in analyzing swimming in Stokes flows.

Babak Nasouri
University of British Columbia

Date submitted: 30 Jul 2016 Electronic form version 1.4