Abstract Submitted for the DFD16 Meeting of The American Physical Society

Stokesian swimming of a helical swimmer across an interface FRANCISCO GODINEZ, ARMANDO RAMOS, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico — Microorganisms swim in flows dominated by viscous effects but in many instances the motion occurs across heterogeneous environments where the fluid properties may vary. To our knowledge, the effect of such in-homogeneity has not been addressed in depth. We conduct experiments in which a magnetic self-propelled helical swimmer displaces across the interface between two immiscible density stratified fluids. As the swimmer crosses the interface, at a fixed rotation rate, its speed is reduced and a certain volume of the lower fluid is dragged across. We quantify the drift volume and the change of swimming speed for different swimming speeds and different fluid combinations. We relate the reduction of the swimming speed with the interfacial tension of the interface. We also compare the measurements of the drift volume with some recent calculations found in the literature.

> Roberto Zenit Universidad Nacional Autonoma de Mexico

Date submitted: 26 Jul 2016

Electronic form version 1.4