Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Flagellar propulsion near walls ARTHUR EVANS, ERIC LAUGA, UC San Diego — Confinement and wall effects are known to affect the kinematics and propulsive characteristics of swimming microorganisms. When a solid body is dragged through a viscous fluid at constant velocity, the presence of a wall increases fluid drag, and thus the net force required to maintain speed has to increase. In contrast, recent optical trapping experiments have revealed that the propulsive force generated by human spermatozoa is decreased by the presence of boundaries. Here we use simple models to analytically elucidate the propulsive effects of a solid boundary on passively actuated filaments and model eukaryotic flagella. We show that in some cases, the increase in fluid friction induced by the wall can lead to a change in the waveform expressed by the flagella which results in a decrease of their propulsive force near a no-slip wall.

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Date submitted: 02 Aug 2010 Electronic form version 1.4