Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Effects of hydrodynamic interactions in bacterial swimming.[1]
SUDDHASHIL CHATTOPADHYAY, XIAO LUN WU, University of Pittsburgh
— The lack of precise experimental data has prevented the investigation of the effects of long range hydrodynamic interactions in bacterial swimming. We perform measurements on various strains of bacteria with the aid of optical tweezers to shed light on this aspect of bacterial motility. Geometrical parameters recorded by fluorescence microscopy are used with theories which model flagella propulsion (Resistive force theory & Lighthill's formulation which includes long range interactions). Comparison of the predictions of these theories with experimental data, observed directly from swimming bacterium, led to the conclusion that while long range inetractions were important for single polar flagellated strains (Vibrio Alginolyticus & Caulobacter Crescentus), local force theory was adequate to describe the swimming of multi-flagellated Esherichia Coli. We performed additional measurements on E. Coli minicells (miniature cells with single polar flagellum) to try and determine the cause of this apparent effect of shielding of long range interactions in multiple flagellated bacteria.

[1]This work was funded by NSF grant #0646573.

Suddhashil Chattopadhyay
University of Pittsburgh

Date submitted: 03 Dec 2007 Electronic form version 1.4