Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Chemotactic strategy of Vibrio alginolyticus studied with an optical trap SUDDHASHIL CHATTOPADHYAY, TUBA ALTINDAL, XIE LI, XIALUN WU, University of Pittsburgh — The canonical "run" and "tumble" mode of chemotaxis, employed by multiple flagellated cells such as *Escherichia coli,* has been studied in great detail over the years. In this work we will demonstrate the usage of an optical trap for studying the chemotaxis of cells belonging to the single flagellated strain of *Vibrio alginolyticus.* This method allows precise and direct observation of chemotactic response, while the cell is exposed to various chemical signals (positive/negative gradient or no chemicals). We have studied the response of the flagellar motor with a precise control on the input signal (chemical gradient), such that a cell can be forced to move up or down a chemical gradient, a control which is not attainable for free swimming cells. The optical trap does not restrict the rotational motion of the bacterium and allows the state of the motor (clockwise or counter clockwise rotation) to be monitored continuously. Our group has recently observed an active flagellar movement (called the "flagellar flick") that is used by cells of *V. algninolyticus* for randomizing swimming direction during chemotaxis. We consider this mode in addition to "back and forth" swimming employed by these cells. A modified chemotactic strategy is proposed and tested using the optical trap.

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Date submitted: 21 Nov 2008 Electronic form version 1.4