

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Non-Perturbative Tracking of Processive DNA Synthesis with Single-Molecule Fluorescence** EVERETT LIPMAN, CHARLES WICKERSHAM<sup>1</sup>, Department of Physics, University of California, Santa Barbara — We have demonstrated recently that double-stranded DNA labeled with a periodic series of fluorescent dyes can be used to track a single helicase. Here we describe how this technique can be modified to follow DNA synthesis. By means of a stepwise loss of fluorescence during strand displacement, we monitor processive motion of a single  $\phi$ 29 DNA polymerase without labeling or altering the enzyme or the template strand, and without applying any force. We observe a wide range of speeds, with the highest exceeding by several times that observed in other single-molecule experiments. Because this method enables repeated observations of the same polymerase traversing identical segments of DNA, it should prove useful for studying sequence-specific effects in DNA replication and transcription.

<sup>1</sup>Present address: California Institute for Quantitative Biomedical Research, UC Berkeley

Everett Lipman  
Department of Physics, University of California, Santa Barbara

Date submitted: 19 Nov 2010

Electronic form version 1.4