

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Statics and Dynamics of Stretched Single DNA Molecules Tug-of-War at Micro-Nanofluidic Interfaces JIAWEI YEH, Institute of Physics, National Taiwan University, ALESSANDRO TALONI, Tel Aviv University, YENGLONG CHEN, CHIA-FU CHOU¹, Institute of Physics, Academia Sinica — Understanding single molecule dynamics at micro-nanoscale interfaces has implications to polymer transport in biological processes, device design for single molecule analysis and biotechnological applications. We report our study on single DNA molecules straddling across a nanoslit, bridging two micro-nanofluidic interfaces, for both its tug-of-war behavior and confinement-induced entropic recoiling at varying length and height (h : 30~100 nm) of a nanoslit. From a modified worm-like chain model in the tug-of-war scenario and the scaling analysis in the entropic recoiling process, we demonstrate the entropic recoiling force is essentially constant, given the degree of confinement, irrespective of the DNA length inside the nanoslit and the slit length. The scaling exponents for the entropic force will also be discussed.

¹corresponding author

JiaWei Yeh
Institute of Physics, National Taiwan University

Date submitted: 17 Nov 2010

Electronic form version 1.4