

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Reconciling the concurrent fast and slow cycling of proteins on gene promoter**<sup>1</sup> WEI WANG, YAOLAI WANG, FENG LIU, Department of Physics, Nanjing University, China — Proteins appeared to cycle on and off the gene promoters with both long and short periods. We proposed a model to explore the dynamics of promoter-protein interactions, which enable gene transcription to proceed orderly and cyclically. We analytically proved that the intervals between two successive productive interactions are less than tens of seconds. Fitting of the model to the experimental data suggests that proteins rapidly cycle on and off the promoter, with the binding time less than several minutes. Different proteins kick in at different phases of the transcriptional cycle, and the percentage of promoters bound by specific proteins in a cell population oscillates with a period of 40min. We thus reconcile the fast and slow cycling of proteins and reveal the essential mechanism of transcription dynamics.

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Date submitted: 29 Nov 2012

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