

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Biophysical modeling of transcription initiation by bacterial RNA polymerase¹ MARKO DJORDJEVIC, Mathematical Biosciences Institute, The Ohio State University — RNA polymerase (RNAP) is a central enzyme in cell, which is responsible for gene transcription. As a first step of transcription initiation, RNAP binds to double stranded DNA and opens the two strands of DNA, which is referred to as the open complex formation. We will present the first quantitative model of the open complex formation by bacterial RNAP. The model is based on statistical physics and establishes an explicit relationship between the rate of transcription initiation and physical properties of promoter sequence and promoter-RNAP interactions [1]. The model leads to a very good agreement with the experiments, with no free parameters used in model testing. This agreement strongly supports both the quantitative model that we present and a qualitative mechanism on which the model is based. Bioinformatics applications of the presented work will also be discussed [2]. [1] M Djordjevic and R Bundschuh, under revision in *Biophys. J.*, 2007 [2] M Djordjevic, to be submitted, 2007.

¹This work is supported by NSF under Agreement No. 0112050.

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Date submitted: 05 Dec 2007

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