

Abstract Submitted
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Mechanical properties of transcription STUART SEVIER, HERBERT LEVINE, Rice University — Over the last several decades it has been increasingly recognized that both stochastic and mechanical processes play a central role in transcription. Though many aspects have been explained a number of fundamental properties are undeveloped. Recent results have pointed to mechanical feedback as the source of transcriptional bursting and DNA supercoiling but a reconciliation of this perspective with preexisting views of transcriptional is lacking. In this work we present a simple model of transcription where RNA elongation, RNA polymerase rotation and DNA supercoiling are coupled. The mechanical properties of each object form a foundational framework for understanding the physical nature of transcription. The resulting model can explain several important aspects of chromatin structure and generates a number of predictions for the mechanical properties of transcription.

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