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**The effect of long-range interactions in DNA melting** AARON SANTOS, Simpson College, WILLIAM KLEIN<sup>1</sup>, Boston University — A theoretical understanding of the DNA melting transition may provide insight into the biological mechanisms of transcription and replication. If this process occurs via nucleation, it should exhibit several key features: metastability, rapid spontaneous growth, and droplet formation. In this talk, I describe the results of recent computational and theoretical studies on nearest-neighbor and long-range DNA models. While the models exhibit some characteristics of classical nucleation when the interaction range is short, they may undergo spinodal nucleation when the interaction range is long. In contrast to classical nucleation droplets, which are compact, spinodal critical droplets are diffuse, fractal-like, and similar to the metastable state. These results have clear implications for transcription and replication in biological DNA.

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