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Sunday–Tuesday, November 21–23, 2021; Phoenix Convention Center, Phoenix, Arizona

[Session M11: Microscale Flows: General & Microscale Flows: Devices](#)

1:10 PM–3:20 PM, Monday, November 22, 2021

Room: North 125 AB

Chair: Burt Tilley, WPI

Abstract: M11.00010 : Looped DNA: supercoiling dependent shape and hydrodynamics*

3:07 PM–3:20 PM

Authors:

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Abstract:

Circularized DNA molecules behave differently than short linear segments of DNA, as they are unable to relax the entire torsional stress. Such conditions are of biological interest, but they can be challenging, as DNA can buckle, if the stress is sufficiently high.

Our elastic theory characterizes the phase space of possible configurations where only open, only writhed, or both configurations can exist. Predictions obtained from such coarse-grained approach explain the apparent asymmetry between over- and under-twisting in earlier cryo-electron tomography images.

We developed a conformational model of molecules with selected values of linking number, which predicts their transport coefficients for given experimental conditions. The computed hydrodynamic properties compare favourably with diffusion coefficient and sedimentation coefficient data from analytic ultracentrifugation measurements.

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