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**Pei Liu\***, 234 Vincent Hall, School of Mathematics, University of Minnesota, Twin Cities, Minneapolis, MN 55414. *Helical organization of DNA-like liquid crystal filaments in cylindrical viral capsids.*

We study equilibrium configurations of ds-DNA in a cylindrical viral capsid. We assume that the state of the encapsidated DNA consist of a disordered inner core enclosed by an ordered outer region, next to the capsid wall. In our approach, a DNA configuration is described by a unit helical vector field, tangent to an associated center curve, passing through properly selected locations.

We postulate an expression for the energy of the encapsulated DNA based on that of columnar chromonic liquid crystals. A thorough analysis of the Euler-Lagrange equations yields multiple solutions to the corresponding boundary value problems. We demonstrate that there is a trivial, non-helical solution, together with two other solutions with nonzero helicity of the opposite sign. Using bifurcation analysis, we derive the conditions for local stability of such solutions and determine when the preferred coiling state is helical. The relevant bifurcation parameters are the ratio of the twist versus the bend moduli of DNA and the ratio between the sizes of the ordered and the disordered regions. (Received January 25, 2022)