

Abstract Submitted
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Structural motifs of biomolecules¹ HOANG TRINH, JAYANTH BANAVAR, Penn State University, University Park, PA 16801, USA, AMOS MARI-TAN, CHIARA POLETTI, ANTONIO TROVATO, Universita di Padova, 35131 Padova, Italy, JOHN MADDOCKS, Ecole Polytechnique Federale de Lausanne, CH-1015 Lausanne, Switzerland, ANDRZEJ STASIAK, University of Lausanne, CH-1015 Lausanne, Switzerland — Biomolecular structures are assemblies of emergent anisotropic building modules such as uniaxial helices or biaxial strands. We provide an approach to understanding a marginally compact phase of matter that is occupied by proteins and DNA. This phase, which is in some respects analogous to the liquid crystal phase for chain molecules, stabilizes a range of shapes that can be obtained by sequence-independent interactions occurring intra- and intermolecularly between polymeric molecules. We present a singularity free self-interaction for a tube in the continuum limit and show that this results in the tube being positioned in the marginally compact phase. Our work provides a unified framework for understanding the building blocks of biomolecules.

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Hoang Trinh
Penn State University, University Park, PA 16801, USA

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