

Abstract Submitted
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Structural motifs of biomolecules¹ HOANG TRINH, JAYANTH BANAVAR, Penn State University, University Park, PA 16801, USA, AMOS MARTAN, 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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