

# Structural motifs of biomolecules

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## Abstract:

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 inter-molecularly 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.