



سمینار هفتگی ماده چگال نرم

Statistical Mechanics of Circular DNAs

Zahra Ahmadian

Physics Department

Sharif University of Technology

Abstract

Circular DNAs that can be found in viruses and bacteria serve as a good example of natural ring polymers. As a semi-flexible polymer, DNA features interesting behavior due to its elasticity and bending properties, especially in the cyclization process. Even more intriguing phenomena, such as supercoiling, can be observed in various types of DNA topologies. Less studied topological structures of circular DNA are mechanically interlocked architectures. Over the last decades, these structures that are mainly composed of mechanically interlocked ring molecules (macrocycles), such as polycatenanes, have been synthesized and observed in vivo. Poly[n]catenanes, that is linear sequences of n monodisperse interlocked ring chains, with potentially much richer bulk behavior have been investigated much less mainly due to major challenges in their synthesis. Here, we investigate the effects of topological constraints in catenanes composed of interlinked ring polymers on their size in a good solvent as well as on the location of their θ -point when the solvent quality is worsened.

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