



سمینار هفتگی ماده چگال نرم

## Circular Polycatenanes: Supramolecular Structures with Topologically Tunable Properties

Journal club: <https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.129.227801#fulltext>

### Abstract

This is a journal club and Reyhaneh is going to talk about Tubiana's work.

Polycatenanes, macrochains of topologically interlocked rings with unique physical properties have recently gained considerable interest in supramolecular chemistry, biology, and soft matter. Most of the work has been, so far, focused on linear chains and on their variety of conformational properties compared to standard polymers. Here would be shown that beyond the linear case and by circularizing such macrochains, one can exploit the topology of the local interlockings to store twist in the system, significantly altering its metric and local properties. Moreover, by properly defining the twist ( $Tw$ ) and writhe ( $Wr$ ) of these macrorings we show the validity of a relation equivalent to the Călugăreanu-White-Fuller theorem, originally proved for ribbonlike structures such as double stranded DNA. The results suggest that circular polycatenanes with storable and tunable twist can form a new category of highly designable multiscale structures with potential applications in supramolecular chemistry and material science.

**Reyhaneh Farimani**

**Sharif University of Technology**

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