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Self-assembly of DNA origami particles in suspension of non-absorbing depleting polymers MAHSA SIAVASHPOURI, MARK ZAKHARY, Brandeis University, CHRISTIAN WACHAUF, HENDRIK DIETZ, Technische Universität München, ZVONIMIR DOGIC, Brandeis University — The connection between the macroscopic properties of a liquid crystalline material and the microscopic features of the constituent molecules is the essential theme that permeates the field of liquid crystals. Previous studies have shown that monodisperse rod-like colloids such as filamentous bacteriophage self-assemble into 1D twisted ribbons in presence of attractive interactions mediated by non-absorbing polymers. The microscopic properties of the colloidal particles play an important role in determining the physical properties of these mesoscopic assemblages. Using structural DNA nanotechnology, we present the design and structure of DNA origami six-helix bundles with tunable microscopic properties, which can be used as a new building block for the self-assembly of rod-like colloidal particles. We demonstrate that formation of higher order structures from the assembly of colloidal rods is universal. By tuning the chirality, aspect ratio and flexibility of the DNA origami particles we can control the physical properties of the entire self-assembled structures.

Mahsa Siavashpouri
Brandeis University

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