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Rheology and nonlinear mechanics of transiently cross linked semiflexible networks: Bundling, ripping, healing, and mechnomemory

ALEX LEVINE, UCLA

Transiently cross linked networks of semiflexible filaments make up the principal structural component of the cell the cytoskeleton. This intracellular network, along with molecular motors, forms the basis for cellular control of morphology and force generation. In this talk, I report on investigations of the effect of transiently bound cross linkers on the structure and mechanics of semiflexible networks. Specifically, I address the role of Casimir or fluctuation-induced interactions between cross linkers in the formation of filament bundles. I report on the linear viscoelasticity of transiently cross-linked networks of bundles. Finally, I discuss the nonlinear mechanical response of such networks, where applied stress induces a persistent structural rearrangement of the network that can dramatically alter its nonlinear response to stresses subsequently applied.