RHEOLOGY AND NONLINEAR MECHANICS OF TRANSIENTLY CROSS LINKED SEMIFLEXIBLE NETWORKS: BUNDLING, RIPPING, HEALING, AND MECHNOMEMORY

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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.