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Nonlinear elasticity of semiflexible polymer networks

FRED MACKINTOSH, Vrije Universiteit, Amsterdam

Networks of filamentous proteins play a crucial role in cell mechanics. These cytoskeletal networks, together with various crosslinking and other associated proteins largely determine the (visco)elastic response of cells. Such biopolymers have also provided new insights into basic aspects of polymer physics. In contrast with conventional polymer materials, the response of these networks is highly non-linear, and their rheological properties can be tuned with small changes in density and local network connectivity. We discuss recent theoretical and experimental efforts to understand these essential materials of the cell.