

<<软物质力学进展>>

图书基本信息

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作者：李少凡，孙博华 主编

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内容概要

作为软物质物理学的一个重要分支，近年来软物质力学的研究取得了重大的发展。本书即是从力学的角度系统总结了软物质物理学的最新进展，深入介绍了软物质力学研究的新方法，包括多尺度胶体计算力学、熵弹性理论、无网格模拟液晶聚合物、DNA模拟计算等，并从跨学科的角度出发，介绍了当前软物质力学研究领域的一些前沿课题。

本书的主编是美国加州大学伯克利分校的李少凡教授和南非科学院院士、开普半岛科技大学的孙博华教授。

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collagenous connective tissues , battery substrates and paper products among many others. For example , the cytoskeleton is a random network of filamentous proteins : filamentous actin (F-actin) , microtubules and intermediate filaments. This network is rendered active by the presence of myosin motor molecules and has a complex role in the mechanics of the cell , the transport of biomolecules within the cytoplasm and in chemo-mechanical transduction and signaling [1-3]. The cytoskeleton is an out-of-equilibrium network which constantly remodels itself in response to external stimuli using a large number of binding and cross-linking proteins interacting with the cytoskeletal filaments. Fiber networks may also be exploited by several infectious bacteria for self-propulsion [4 , 5]. The bacterial pathogen *listeria monocytogenes* , responsible for more than 2000 annual illnesses and deaths in US , form a filamentous comet tail by taking over the host cell actin machinery. The comet tail is a complex network of cross-linked filaments which are constantly polymerized and depolymerized to generate forces to propel the bacteria within the cytoplasm of the infected cells and into the other neighboring cells. The local elasticity of these media determines to a large extent cellular growth rates. Connective tissues (CTs) such as cartilage and tendon belong to another category of biological fibrous networks. The mechanical functionality of CTs derives directly from the structure and composition of their extracellular matrix (ECM) . ECM is a network of insoluble fibrils (e.g. , collagen , elastin) and soluble proteoglycan polymers. It is responsible for carrying stresses and maintaining tissue shape while influencing a large number of other biological properties and functions of the tissue. In any connective tissue , the constituents are meticulously arranged inside the extracellular matrix to optimize the function of that specific tissue.

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