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The cytoskeleton and membrane: thermal and mechanical properties

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Abstract content
   (Max 300 words)
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Special chars

Membranes encapsulate cells or cellular organelles and the cytoskeleton provides not only mechanical properties to cells but also is important in the internal transportation. In living systems these structures are highly dynamic and coupled to other processes in a complex way. In this lecture we will investigate how the experimental and theoretical methods of statistical physics of membranes, polymers and filaments can guide us to ask important questions relating form, fluctuation and function in cells. First, we shall address the role of thermal fluctuations on the elastic and spatial properties of membranes and filaments. We then also mention non-equilibrium processes of filament growth and shortening, and the fusion of membranes, before looking at how one can start to understand the more complex, coupled structures found in the cell. The lecture will conclude with a look at a selection of experimental techniques available that allow researchers to access forces and other related physical quantities directly in cells.

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