TIFR Centre for Interdisciplinary Sciences
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Seminar

Mechano-memory in sheared cross-linked actin networks

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Is it possible to control the shear modulus of a material mechanically? We reconstitute an assembly of cross-linked actin filaments, a major component of cell cytoskeleton, to show that the system has remarkable property to respond under shear in a deformation history dependent manner. When a large shear stress pulse is applied to the system, the system remembers the direction of deformation long after the stress pulse is removed. For next loading cycle, shear response of the system becomes anisotropic; if the applied pulse direction is same as the previous one, the system behaves like a viscoelastic solid but a transient liquefaction is observed if the pulse direction is reversed. Imaging and normal force measurements under shear suggest that this anisotropic response comes from stretching and bending dominated deformation directions induced by the large shear deformation giving rise to a direction dependent mechano-memory. The long time scale over which the memory effect persists has relevance in various deformations in cellular and multicellular systems.

Tuesday, Oct 28th 2014

11:30 AM (Tea/Coffee at 11:15 AM)

Seminar Hall, TCIS