



# Seminar, Department of Physical Sciences, Bose Institute, Kolkata

**Self-organization in Active Polymers and Living Matter**

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**Abstract:** Active matter, characterized by intrinsically broken time-reversal symmetry at microscopic scales, exhibits complex spatiotemporal features that spontaneously emerge within the system. I will demonstrate how active segmental crossings in polymers can drive microphase separation, forming domains with emergent anisotropic organization that equilibrium physics cannot capture (RD et al., *eLife* 2022). Additionally, I will illustrate how active perturbations enhance tracer dynamics through a newly identified mode associated with mesh remodeling in the embedding polymeric medium (RD et al., *PRL* 2024). Finally, after briefly discussing our ongoing exploration of a catalytic mechanism potentially underlying the synapsis of broken DNA ends (N. Chappidi et al., *Cell* 2024), I will conclude by highlighting the broader implications of these findings for cellular function, especially in the spatiotemporal regulation of genetic material.

**Date/time: December 20, 2024 (Friday) at 12:00 Noon**

**Venue: Physics Seminar Room (204, second floor, UAC, BI)**