

## **Seminar**

### **Dynamics of Active Polymers: Emergent Behaviour and Response to External Flow**

**P B Sunil Kumar**

**IIT-M, Chennai**

Polymers composed of active structural units, capable of converting chemical energy to mechanical work, are abundant in living organisms and can also be synthesised in the laboratory. Understanding how fluid flows affect the dynamics and deformations of these active filaments is crucial for comprehending various biological processes.

In this presentation, I will discuss the emergent dynamics exhibited by a system of active flexible filaments and their response to external flow. Firstly, I will delve into the interplay between the filament's activity, flexibility, and hydrodynamic interactions, which gives rise to a multitude of novel dynamic behaviours. Notably, we observe the formation of knots and links, non-equilibrium transitions from isotropic to nematic phases, as well as the emergence of motile defects.

With the aim to understand the dynamics of such active filaments in the crowded environment of a biological cell, we have developed a dry active polymer model that retains the essential characteristics of its wet counterpart. In the second part of this talk, we will explore the dynamics of such an active filament in the presence of a shear flow, uncovering additional complexities in the system.

***Tuesday, Jan 16<sup>th</sup> 2024***

***11:30 Hrs (Tea / Coffee 11:15 Hrs)***

***Auditorium, TIFR-H***