Contribution ID: **63** Type: **not specified**

Active semiflexible polymer under shear flow

Monday, 19 December 2022 16:05 (20 minutes)

The dynamic behavior of a self-propelled semiflexible filament of length L is considered under the action of a linear shear flow. The system is studied by using Brownian multi-particle collision dynamics. The system can be characterized in terms of the persistence length Lp of the chain, of the Peclet number, and of the Weissenberg number. The quantity Lp/L measures the bending rigidity of the polymer, the Peclet number Pe is the ratio of active force times L to thermal energy, and the Weissenberg number Wi characterizes the flow strength over thermal effects. In this presentation we will focus our attention to intermediate values of Pe corresponding to the weak spiral regime when no external flow is applied. The numerical results allow us to outline the main features of the physics underlying the considered system:
• At low values of Wi, polymer is stretched by activity and aligned by shear along the flow direction. This effect is more marked in the case of more flexible chains.
• At the intermediate values of Wi, polymer is prone to tumble due to shear and this promotes a contraction of the chain.
• At very high values of Wi, activity sums up to shear enhancing polymer stretching and deformation.

Primary author: LAMURA, Antonio (IAC CNR)

Presenter: LAMURA, Antonio (IAC CNR)

Session Classification: Session 3 B