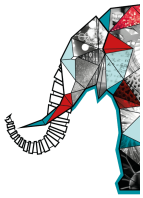
25e Congrès Général de la Société Française de Physique



Contribution ID: **192** Type: **Orale**

Helical Superstructure of Intermediate Filaments

Tuesday, 9 July 2019 10:00 (30 minutes)

Intermediate filaments are the least explored among the large cytoskeletal elements. We show here that they display conformational anomalies in narrow microfluidic channels. Their unusual behavior can be understood as the consequence of a previously undetected, large-scale helically curved superstructure. Confinement in a channel orders the otherwise soft, strongly fluctuating helical filaments and enhances their structural correlations, giving rise to experimentally detectable, strongly oscillating tangent correlation functions. We propose an explanation for the detected intrinsic curving phenomenon — an elastic shape instability that we call autocoiling. The mechanism involves self-induced filament buckling via a surface stress located at the outside of the cross section. The results agree with ultrastructural findings and rationalize for the commonly observed looped intermediate filament shapes. Beyond curvature, explaining the molecular origin of the detected helical torsion remains an interesting challenge.

Ref: L.Bouzar, M.M.Müller, R.Messina, B.Nöding, S.Köster, H.Mohrbach, I.M.Kulić, Phys. Rev. Lett, 122, 098101 (2019).

Choix de session parallèle

2.4 Fluctuation et biologie

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Session Classification: Séance Parallèle