

Predictive polymer models of genome 3D structure

mercoledì 18 dicembre 2024 10:50 (20)

Chromosomes have a complex spatial structure that serves vital functional purposes, yet their self-organization principles are largely unknown. I discuss our recent work combining polymer physics and machine learning to understand how chromosomes are folded and regulated in the cell nucleus. After a brief overview of recent experimental advances to measure chromosome 3D structure, I discuss our physics models showing that phase transition mechanisms can control chromosome architecture and its link with gene regulation and cell function. Several experiments have confirmed those models, notably their predictions on how genetic mutations result in diseases such as congenital disorders, opening the way to novel applications in biomedicine.

Primary author(s) : Dr. BIANCO , Simona

Presenter(s) : Dr. BIANCO , Simona

Session Classification : Statistical Physics

Track Classification : Statistical Physics