



School of Nano Science (IPM)



Condensed Matter & Statistical
Physics Group (IPM)

Weekly Webinar

Elastic model for studying structure, energy, and unwrapping of dinucleosome

Speaker: **Dr. Seyed Hashem Fatemi**

*Department of Physics, Institute for Advanced Studies in Basic sciences, Zanjan,
Iran*

Packaging of genomic DNA into chromatin is essential for eukaryotic cells. The nucleosomes, which are the building blocks of the chromatin, are connected to each other with 10-90 base pairs (bp) of linker DNA. The dynamics of nucleosomes has crucial effects on the expression, replication, and repair of genomes in eukaryotes. The equilibrium structure of a dinucleosome is studied using an elastic model that takes into account the force and torque balance conditions. Using the proper boundary conditions, it is found that the conformational energy of the problem does not depend on the length of the linker DNA. In addition, it is shown that the two histone octamers are almost perpendicular to each other and the linker DNA in short lengths is almost straight. We explore the energy landscape and configurations of a dinucleosome in different unwrapped states. We propose a theoretical analysis of dinucleosome wrapping and unwrapping dynamics in the presence of an external force. Moreover, using a dynamical Monte-Carlo simulation algorithm, we demonstrate the dynamical features of the system such as the unwrapping force for partial and full wrapping processes.

Wednesday, 30 December 2020 (۱۰ دی ۱۳۹۹), 14:00-15:00

Virtual Meeting Room (please log in as a guest):

<https://www.skyroom.online/ch/schoolofnanoscience/weeklyseminars>

