

UIC
COLLOQUIUM
Department of Physics

Wednesday, April 13, 2016

DNA Mechanics and Gene Regulation

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Abstract: In addition to the genetic message, DNA base sequence carries a multitude of structural and energetic signals important to the packaging and processing of the genetic material. One way in which these signals enter is through the looping of DNA, mediated by proteins that attach to specific, widely separated base-pair elements along the chain molecule. The looping plays a crucial role in the management of genetic information, allowing for communication between sequentially distant elements along the long, double-helical molecule and contributing to the organization of the molecule as a whole. Our direct treatment of the structures and fluctuations of protein and DNA in terms of the spatial arrangements of successive base pairs makes it possible to decipher the precise contribution of protein and DNA to loop formation while capturing the complex, chain-length-dependent variation in looping propensities deduced experimentally. The presentation will include examples of how local features of DNA influence the ease of looping and how nonspecific-binding proteins build up, counter to expectations, at particular sites along the DNA loop.

The Department of Physics Colloquium will be held at 3pm in 238 SES.

**Refreshments will be served from 2:45 pm to 3pm outside of room 238 SES*