



## L4H Seminar FELIX RITORT 'Single Molecules: From Force Spectroscopy to Molecular Evolution'

FELIX RITORT

Facultat de Física, Universitat de Barcelona

SPAI

March 19, 2014

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Wednesday, March 19, 2014, 10:30. Seminar Room

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### **SPAIN**

The possibility of using light to exert tiny mechanical forces has spurred the development of new experimental techniques that are capable of manipulating matter to an unprecedented and exquisite detail. By exerting forces in the piconewton range, optical tweezers make possible to manipulate single molecules paving the way to the accurate determination of

those weak interactions mostly responsible of many biochemical reactions and remodeling processes so essential for biological matter. In this talk I will review a few selected examples of investigations carried out in my lab that combine the finest tools from statistical physics with single molecule data to improve our current knowledge of thermodynamics and kinetics of conformational transitions in nucleic acids and proteins. I will start showing how force spectroscopy studies have greatly contributed to a deep characterization of the energetics of hybridization of DNA and RNA and the affinity of peptides and proteins binding the double helix. I will then progress by discussing fundamental aspects underlying nonequilibrium fluctuations in ATP-powered molecular machines to finally conclude with a digression on future perspectives on the single molecule field and how it may contribute to our understanding of molecular evolution in biology.

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**Hosted by Prof. Melike Lakadamyali**