

This book provides the basis for understanding the elastic properties of nucleic acids (DNA, RNA), the methods used to manipulate them (e.g., optical, magnetic and acoustic tweezers and traps), and how to observe their interactions with proteins (e.g., fluorescence microscopy, FCS, FRET). It then exemplifies the use of these various methods in the study of three families of DNA enzymes: polymerases, helicases, and topoisomerases. Rather than being exhaustive, this book aims at stimulating the imagination of readers in the application of these single-molecule approaches to the study of DNA/RNA and their interactions.

David Bensimon and Vincent Croquette have been co-leaders of a group at the LPS-ENS that has been studying single DNA molecules and their interactions with proteins since 1991. Jean-François Allemand, Terence Strick, and Xavier Michalet have been their students and collaborators ever since. They have jointly developed magnetic traps and have been studying various aspects of single-molecule DNA/protein transactions. Since joining the lab of Professor S. Weiss at UCLA, Xavier Michalet has been focusing on the use of fluorescent and spectroscopic methods to study single biomolecules.

'This book, by experimental masters of the single-DNA field, presents a broad and authoritative review. The text emphasizes simple physical modelling of beautifully conceived experiments, as well as the kinds of biologically relevant questions that can be answered using single-molecule approaches. I recommend it for physicists and biologists alike.'

John F. Marko, Department of Molecular Biosciences and
Department of Physics and Astronomy, Northwestern University

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