Single Molecule Science: Physical Principles and Models

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The observation and manipulation of individual molecules is one of the most exciting developments in modern molecular science. **Single Molecule Science: Physical Principles and Models** provides an introduction to the mathematical tools and physical theories needed to understand, explain, and model single-molecule observations.

This book explains the physical principles underlying the major classes of single-molecule experiments such as fluorescence measurements, force-probe spectroscopy, and nanopore experiments. It provides the framework needed to understand single-molecule phenomena by introducing all the relevant mathematical and physical concepts, and then discussing various approaches to the problem of interpreting single-molecule data.

The essential concepts used throughout this book are explained in the appendices and the text does not assume any background beyond undergraduate chemistry, physics, and calculus. Every effort has been made to keep the presentation self-contained and derive results starting from a limited set of fundamentals, such as several simple models of molecular dynamics and the laws of probability. The result is a book that develops essential concepts in a simple yet rigorous way and in a manner that is accessible to a broad audience.

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