NSYSU physics 書報討論

Weekly Seminar

Single-Molecule and Single-Cell Dynamic Force Spectroscopy in the Physics of Living Matter

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speaker's URL

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At its core, living matter is a convoluted, out-of-equilibrium system governed by complex energy landscapes and nanoscale forces. By probing these physical properties, single-molecule and single-cell dynamic force spectroscopy provide valuable insights into the thermodynamics and dynamics of living systems. Using an atomic force microscope (AFM), we are developing a new label-free method to study a range of living systems, from biomolecular dynamics to complex cellular states, based on their mechanical and acoustic signatures. Our research explores the force responses of systems such as multimeric proteins, DNA, graphene nanoribbons, and mammalian cells, demonstrating the power of force spectroscopy to address complex problems, such as protein folding and cancer diagnosis. Ultimately, this approach establishes nanoscale mechanical signature as a crucial tool for deciphering the physical code of living matter.

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