Transition State Susceptibility in Single Molecule Force Spectroscopy

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Single molecule experiments allow to investigate with unprecedented detail the kinetics of biomolecules, such as DNA, RNA and proteins. Much information can be estimated from phenomenological models like the Bell-Evans theory[1]. However, a lot of theoretical work still needs to be done in order to unravel, form experimental measurements, ac- curate details of the molecular free energy landscape[2,3]. Here we use the Kramers theory to show that even in molecules with a unique unfolding pathway under the action of a mechanical force, the transition state location has a strong impact on data interpretation[4]. The concept of a transition state susceptibility is introduced in order to identify abrupt transitions in the location of the transition state and to detect specific binding of magnesium ions to nucleic acids[5].

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