Stochastic Simulation of smFRET

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In Physics, single-molecule Förster Resonance Energy Transfer (FRET) can be modeled using stochastic processes, and we can quantify the changes in fluorescence by studying the motion of fluorescent acceptor and donor dyes on molecules. FRET is the process through which energy is transferred between the two dyes. The figure below is a picture of an acceptor molecule that is exploring an energy landscape that consists of two wells. Since the acceptor molecule explores the landscape freely, there exist non-instantaneous transitions between the states, which affects the resulting FRET measurements.

More on single-molecule FRET simulations can be found in: "Time-heterogeneity of the Förster Radius from Dipole Orientational Dynamics Impacts Single-Molecule FRET Experiments" by D Frost, K Cook, and H Sanabria (arXiv:2404.09883)

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