

MAR10-2009-008426

Abstract for an Invited Paper
for the MAR10 Meeting of
the American Physical Society

Photon-by-photon trajectories of single protein molecules folding and unfolding¹

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The transition path time in kinetics is the tiny fraction of an equilibrium trajectory for a single molecule when the transition actually happens and has not been measured for any molecular process in solution. From measurements of photon-by-photon trajectories for fluorophore-labeled single protein molecules undergoing folding and unfolding transitions we have determined that the upper bound for the transition path time is more than 10,000-fold less than the mean first passage time, consistent with a Kramers' analysis of diffusive barrier crossings.

¹Work done in collaboration with Hoi Sung Chung, Kevin McHale, Irina Gopich, and John M. Louis