Abstract Submitted
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Probing protein dynamics using Fluorescence Resonance Energy Transfer with donors of different lifetimes WEIQUN PENG, George Washington University, TANIA CHAKRABARTY, University of Chicago, PAUL GOLDBART, University of Illinois at Urbana Champaign, PAUL SELVIN, University of Illinois at Urbana Champaign — Fluorescence resonance energy transfer (FRET), using nanosecond dyes, and its derivative, Lanthanide-based resonance energy transfer (LRET), using millisecond-lifetime lanthanide chelates, are methods to measure distances on the 2-10 nm length-scale. It has been found that in certain systems energy transfer efficiency E for FRET and LRET measurements can be dramatically different [Chakrabarty et al., PNAS, 99: 6011-6016 (2002)]. Here we develop a theoretical model that shows that the dramatic difference can be explained by the presence of intrinsic dynamics of the system. Furthermore, we quantitatively investigate how information about the time-scale and distance-scale associated with the intrinsic dynamics can be inferred, by comparison of FRET and LRET results.

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