

Ultrafast Processes of Natural Light Harvesting Complexes and Model Systems

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Photosystem I (PSI) is a natural light harvesting complex that drives oxygenic photosynthesis. PSI uses ~300 chlorophylls to absorb photons and transfer excitation energy to reaction centers where charge separation takes place with a high quantum efficiency. Elucidating the mechanism of energy transfer and electron transfer in PSI is essential for understanding its high quantum efficiency and subsequently incorporating this information into design principles for bioinspired systems for solar energy conversion. In this talk, I will discuss our recent studies in this area where we apply multidimensional spectroscopies in the visible and mid-IR spectral regions to PSI and structurally simpler model systems. From our studies we gain insight into energy equilibration involving lower-lying electronic states and ultrafast solvation dynamics.