Adaptive UF PPS Model Study of Structures and Reactions in Biomolecules: New Selective Bio-Molecular Probes through High Magnetic Fields

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Adaptive models of ultrafast polarization phase-selective (UF-PPS) EM radiation structures and their signatures have been tested on probing dynamics and structure (imaging) of even highly coherent correlated electrons in molecules. New theoretical and experimental studies indicate their comparative advantages when applied to ultrafast events [1]. Here we demonstrate their application in bio-molecules, such as recently discovered [2] unusual cluster structures as well as unusual enzymatic, photonic and redox synthesis and electron transfers and turnovers. The models identified molecular systems that can function as specific redox agents *in vivo* and *in vitro* and indicated novel highly selective coherent channels. Of particular interest for the theoretical modeling is identification of electron and vibrational coupling. Previous models had significant difficulties when evaluating this important contribution. We discuss here results of our work and compare it to the experimental results.

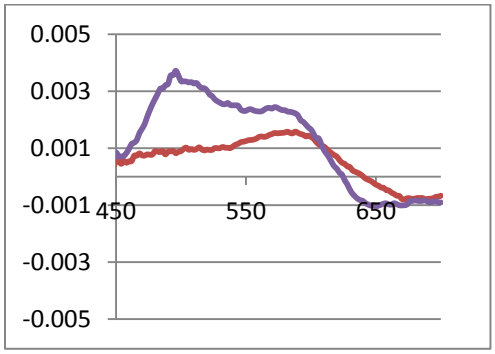

Fig 1.Temperature and magnetic field (25T) dependent PPS studies of Fe clusters in protein [3] are used to test predictions of theoretical models (x -axis is nm, y axis -PPS units).

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[3]2012 Annual NHMF technical report (2012)