Vibronic and Spin Coherence

Building Coherence with Strong Electronic Coupling

How does vibronic coherence between multiple electron donors influence ultrafast electron transfer to a single electron acceptor?

Ultrafast 2DES is used to study cofacial Zn porphyrin dimeric donors linked to symmetrically placed benzoquinone acceptors (<u>Wasielewski,</u> <u>Fleming, Beratan, Makri</u>).



Engaging coherence - Producing Leaders

Interchanging Spatial & Spin Coherence

Can electron transfer be vibronically incoherent yet spin coherent?

Electron transfer from a single Zn porphyrin donor to a pair of identical acceptors. (<u>Wasielewski</u>, <u>Beratan</u>). (*J. Phys. Chem. A.* 2021, *125*, 825-834).



How does the orbital angular momentum intrinsic to chiral molecules influence their spin dynamics?

Circularly polarized light excitation of chiral porphyrins leads to unusual spin polarization of their triplet states. (Wasielewski, Therien, Beratan, Makri).



Directing Particles & Quasiparticles Coherently

Can excitation of a circularly symmetric electron donor with degenerate electronic transitions cause spin-coherent electron transfer to a nearby acceptor?

Zn porphyrins and other electron donor chromophores with degenerate electronic transitions are co-crystallized with acceptors having lower symmetry. Photoexcitation of the donor leading to electron spin polarization is being studied. (Wasielewski, Therien, Beratan, Makri).



Synthesizing Quantum Coherence