Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Femtosecond Polarization Phase Selective (PPS) High Magnetic Field Studies of Electron-Spin-Hole (ESH) Dynamics: New Tools for Ultrafast Imaging Fe-centered ESH Transfer Mechanisms Steps[1] KRESIMIR RUPNIK, BENJAMIN COOPER, TAYLOR DUNNE, KATHERINE GEROSA, KAITLYN MERCER, Louisiana State University, STEPHEN MCGILL, Florida State University — In previous work, new Nanoparticle-enzyme Based Hybrids (NEBH) synthesis methods were investigated for nanoparticles of different shapes and electron energies. These hybrids can provide electromagnetic-field-driven ESH separations and transfers to desired molecular locations. Of paramount biomedical interest are the activity centers (including Fe-clusters) in proteins that perform their intended function and help synthesize other molecules. In this work we discuss results of our recent *in situ* ESH dynamics measurements: we use <15fs (Vitara) PPS broad band pulses and ultrahigh, 25T, magnetic fields from Split-helix magnet at NHMFL. Work included multi-spectral domain PPS harmonic generations and PPS sum frequency generations. Model compounds, including cytochromes, were used for testing and calibrations and previously studied Fe-S enzymes were prepared for measurements. While PPS opto-magnetic methods are known for their insight into electronic structure, our femtosecond measurements can provide ultrafast dynamic imaging of ESH mechanisms decision making steps.

[1]UF-PPS Project, performed in part at NHMFL, supported by NSF CA No. DMR-1157490, and 0654118 and U.S. DOE

Kresimir Rupnik
Louisiana State University

Date submitted: 06 Dec 2016 Electronic form version 1.4