

Abstract Submitted  
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**Ultrafast Polarization Phase Selective (PPS) molecular radiation signatures helping molecules-build- molecules that can do what no molecule has done before** KRESIMIR RUPNIK, LSU, JUDY CHERIAN, TAKAHISA TOKUMOTO, STEPHEN MCGILL , National High Magnetic Field Laboratory — Molecular level process-control in enzyme-like hybrid bio-systems and related molecular electronics, redox or energy conversion and storage devices requires understanding of fast electronic, nuclear and photonic reagents at many different sites. Indeed, the integration of various components into a single molecular architecture often requires considerable knowledge of structural details not readily available. Our studies based on the combination of carefully tailored ultrafast PPS THz, optical, and soft X pulses, low and high magnetic fields and temperatures provide us with highly selective signatures of electronic and nuclear modes involved in such site-specific molecular physics and chemistry. Examples of recently identified coherent modes of significant importance in molecules-building-molecules bottom-up construction of larger integrated systems are presented and discussed.

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