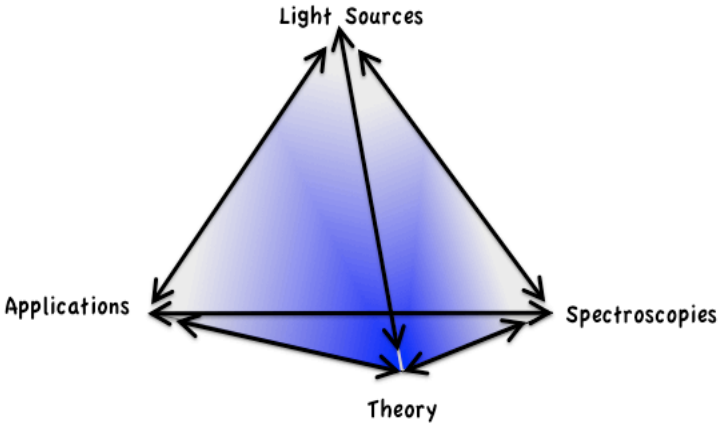
Impact of Ultrafast Lasers in Chemical Physics: Advances in Nonlinear Spectroscopies, Light Sources, and Applications

Ultrafast laser methods have led to an extraordinary number of new insights about molecules and materials through spectroscopic and dynamic characterizations. In part, these advances have occurred because the experimentally accessible time scales match time scales used in computational approaches. At the same time, advances in the theoretical framework describing and predicting new optical phenomena have encouraged forays into novel experiments. Fundamental to these successes are the efforts to produce light sources with high power and high stability at femtosecond and shorter time scales. Moreover, these light sources have encouraged the development of new optical technologies capable of producing ultrashort light pulses over a wide wavelength range from THz to hard x-rays, enabling a multitude of nonlinear and multidimensional spectroscopic techniques. As indicated in the adjacent graphic, this symposium will bring investigators attentive to development, application, and theory of ultrashort laser spectroscopy together into a single symposium. Presentations will address issues such as:



- How has the development of new light sources facilitated new chemical physics explorations?
- How do theoretical predictions in chemical physics lead to new experimental results?
- How does the demand for new spectroscopies drive the development of new ultrashort pulsed light sources tunable from the UV to IR?
- What new applications have grown out of the interaction of new light sources and new spectroscopies?
- What new short pulsed light sources exist and how can they be harnessed to increase our understanding of basic chemical physics phenomena?
- How can we manipulate light to attain new spectroscopic and dynamic techniques? This includes topics such as pulse shaping, diffractive optics, quantum optics, entanglement.
- How have researchers developed new spectroscopic techniques or extended existing techniques into different spectroscopic regimes?
- What is the future of multidimensional spectroscopies?
- Can we harness light to control physical and chemical processes?

This symposium will showcase new laser technologies, their applications and associated theoretical framework highlighting revolutionary measurements of fundamental processes important in physics, chemistry, biology, materials science and beyond.

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