

The Center for Advanced Photonics Research
LASER SCIENCE SEMINAR SERIES

"Spatiotemporal Coherent Control with Picometer and Attosecond Precisions"

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Coherent control is based on manipulation of quantum phases of wave functions. It is a basic scheme of controlling a variety of quantum systems from simple atoms to nanostructures with possible applications to novel quantum technologies such as bond-selective chemistry and quantum computation. We have developed high-precision wave-packet interferometry by stabilizing the relative quantum phase of two molecular wave packets on the attosecond time scale [1-6]. We have also succeeded in controlling and visualizing spatiotemporal images of such wave-packet interference on the picometer and femtosecond scales [1,7]. Our high-precision spatiotemporal coherent-control has been applied to fundamental tests of quantum mechanics and molecule-based information processing [1-6, 8]. The latest further progress toward the coherent control of condensed phases will be presented.

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Friday, June 26, 2009 / 2:00 pm / Beury Hall, Room 404



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