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Pump-probe spectroscopic studies of surface plasmon resonance of gold nanorods[1] ANGELA ANGELA, YU DING, CHUNQIANG LI , University of Texas at El Paso, BIOPHOTONICS LAB TEAM — Current optical microscopic techniques have widely utilized fluorescence of molecules to observe biomolecular and cellular processes in the nanosecond time scale. Femtosecond (10^{-15} s) laser spectroscopy allows us to study ultrafast dynamics in molecular systems. In this work, a pump-probe method which does not rely on the fluorescence of the material is being developed for super-resolved optical microscopy to study the surface plasmon resonance (SPR) of gold nanorods for future biomedical imaging. Two femtosecond pump laser beams at 510 nm, one with Gaussian mode and the other with donut mode, are modulated and used to pump the gold nanorods sample. A probe laser beam with Gaussian mode at 820nm detects the sample after excitation from pump beams, and subsequently becomes modulated due to SPR of gold nanorods. By observing the slight modulation of the probe beam we can study the ultrafast electron and phonon dynamics in gold nanorods

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