

Abstract Submitted
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Three Photon Absorption and the Nonlinear Index of Refraction in GaAs WALTER HURLBUT, BRYAN NORTON, NAAMAN AMER, JEREMY DANIELSON, YUN-SHIK LEE, Oregon State University, Department of Physics, KONSTANTIN VODOPYUNOV, MARTIN FEJER, Stanford University, Department of Physics, VLADIMIR KOSLOV, Microtech Instruments, Inc., FEMTOSECOND SPECTROSCOPY IN SEMICONDUCTORS TEAM — We demonstrate and quantitatively measure the previously unknown nonlinear absorption and refraction in GaAs in the spectral range from 1200 to 2630 nm using the Z-Scan Technique. We measured the transmission of the femtosecond pulses tightly focused on a 350- μm -thick GaAs wafer as a function of incident pump intensity by scanning the sample position with respect to the focal plane. The intensity dependent two-photon and three photon absorption coefficients are obtained by analyzing the data. The nonlinear index of refraction, n^2 , is acquired by the closed-aperture z-scan in which a small aperture in the far field is inserted and the self-lensing was measured by the change in on-axis transmittance. Scaling rules based on a quasi-dimensional analysis confirms the experimental results.

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