Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Managing thermal effects in z-scan measurements on PTCDA films NIRANJALA WICKREMASINGHE, XIAOSHENG WANG, Department of Physics, University of Cincinnati, Cincinnati, OH 45221, HEIDRUN SCHMITZER, Department of Physics, Xavier University, Cincinnati, OH 45207, HANS PETER WAGNER, Department of Physics, University of Cincinnati, Cincinnati, OH 45221
— We study the two-photon absorption in micrometer thick polycrystalline PTCDA (perylene-3,4,9,10-tetracarboxylic-3,4,9,10-dianhydride) films using the open aperture z-scan technique. The films were grown by organic molecular beam deposition on Pyrex substrate and have been excited with 150 fs high repetition rate laser pulses at a wavelength of 820 nm. The pulses are focused onto the sample with a 10 x or a 20 x long distance microscope objective lens. The excitation intensities have been kept the same in both cases. To study the influence of sample heating the laser repetition rate has been varied from 4 MHz to 50 kHz by an acousto-optic pulse selector. At laser repetition rates larger than 200 kHz and 1 MHz for the 10 x and 20 x microscope lenses, respectively, we observe a reduction of the z-scan transmission dip. This reduction is attributed to a counteracting thermal effect due to film heating in the focus area. The reduced thermal effect using a 20 x microscope lens is attributed to faster thermal diffusion from the smaller focus area into the unexcited film. At lower repetition rates the z-scan dip is independent of the repetition rate and the two-photon absorption coefficient in PTCDA films was determined to be approximately 4 cm/GW.

Niranjala Wickremasinghe
Department of Physics, University of Cincinnati, Cincinnati, OH 45221

Date submitted: 18 Nov 2012 Electronic form version 1.4