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Optical Probe of the Density of Defect States in Organic Thin-Film Transistors MIHAELA BREBAN, DANILO ROMERO, University of Maryland, VINCENT BALLAROTTO, Laboratory for Physical Sciences, ELLEN WILLIAMS, University of Maryland — We investigate the role of defect states associated with different gate dielectric materials on charge transport in organic thin film transistors. Using a modulation technique we measure the magnitude and the phase of the photocurrent¹ in pentacene thin film transistors as a function of the modulation frequency. The photocurrent generation process is modeled as exciton dissociation due to interaction with localized traps. A time domain analysis of this multi-step process allows us to extract the density of defect states. We use this technique to compare the physical mechanism underlying performances of pentacene devices fabricated with different dielectric materials. *Supported by the Laboratory for Physical Science ¹ M. Breban, et al. “Photocurrent probe of field-dependent mobility in organic thin-film transistors” Appl. Phys. Letts. 87, 203503 (2005)

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