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Modeling fast photoemission from GaAs[1] EVAN BRUNKOW, NATHAN CLAYBURN, MARIA BECKER, ERIC JONES, HERMAN BATELAAN, TIMOTHY GAY, University of Nebraska- Lincoln — We present a model that enables us to determine if multi-photon electron photoemission is "fast," i.e., has a time duration comparable to the laser pulses that produce it. In femtosecond pump-probe experiments performed at 775 nm and 100 MHz, laser-induced field emission of electrons from metallic nanotips is considered fast when the emission process is nonlinear in intensity and additive. This means that the emission rate from the source with both pulses present is equal to the sum of the emission rates generated from the pump and probe pulses alone at sufficient delays. [1]. For a GaAs tip source, the emission is instead sub-additive for delays less than a nanosecond, meaning that the emission rate with both pulses present is less than the sum of the pump and probe beams alone [2]. Our model and preliminary data supports the conclusion that the emission from GaAs is fast, and we conclude any material with a non-linear emission process and sub-additivity also has fast emission. This model predicts that the presence of electrons in the conduction band of GaAs causes a decrease in emission due to the second laser pulse. [1] B. Barwick *et al.*, New J. Phys., 9, 142 [2] E. Brunkow *et al.*, B.A.P.S., 61, No. 8, 53

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