Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Morphology dependence of multi-photon ionization of bulk GaAs
EVAN BRUNKOW, NATHAN CLAYBURN, HERMAN BATELAAN, TIMOTHY GAY, Univ of Nebraska - Lincoln — Using a Ti:Saph femtosecond oscillator with average power between 100 and 200 mW and a 20 fs pulse width ($\sim$ 10 nJ/pulse), we previously found that we could excite electrons from bulk GaAs using multi-photon absorption [1]. Further investigation has shown that the number of electrons emitted per laser pulse depends on the part of the crystal from which the electrons are being emitted. Emission from bulk GaAs, edges of rectangular GaAs surfaces, and tips of GaAs shards appears to give significantly different quantum efficiency. In the bulk, we generally see very few electrons emitted, except from occasional "hot" spots where we see some emission ($\sim 10^2$ Hz). These spots appear to be randomly spaced and we have been unable to discern their nature. On the edges of a crystal, we see an increase in electron counts and typically observe 10^3-10^5 Hz. When we make a crystal that has a sharp point on the tip, we have seen rates as high as 10^5-10^7 Hz. We will present systematic data related to emission from various GaAs targets, as well as the results of several investigations into the temporal characteristics of these pulses.

[1] E. Brunkow et al., Bull. Am. Phys. Soc. **58**, 38 (2013)

Evan Brunkow
Univ of Nebraska - Lincoln

Date submitted: 22 Jan 2014 Electronic form version 1.4