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**Measurement of Ultrafast Plasma Currents in Two-Color Laser-Produced Plasma** YONGSING YOU, TAEK-IL OH, KIYONG KIM, University of Maryland College Park, INSTITUTE FOR RESEARCH IN ELECTRONICS AND APPLIED PHYSICS TEAM — We report the measurements of quasi-dc plasma currents produced in two-color laser-induced plasma. In the plasma current model proposed by Kim et al [1], the bound electrons of atoms or molecules undergo rapid tunneling ionization under an asymmetric laser field consisting of the fundamental and its second harmonic fields. The electrons liberated by the mixed laser fields form a directional transverse current on the timescale of sub-picosecond, simultaneously emitting radiation at THz frequencies. The principle of our photocurrent measurement is based on the Faraday rotation effect, in which the magnetic field induced by time-varying plasma current rotates the polarization of probe pulse propagating through the plasma. With polarization sensitive imaging and varying the pump-probe delay, we can map out the magnetic field profiles with high spatial and temporal resolution. We find that the magnetic field is confined within sub-100 microns in the transverse direction and lasts for sub-picosecond. The time derivatives of the plasma currents, calculated from our measured magnetic fields, are consistent with the measured THz waveforms. The correlation between them supports the plasma current model.

[1] K. Kim et al, Opt Express **15**, 4577 (2007).

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