Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Spectral Modulation of Self-Guided Laser Pulses ARTHUR PAK, JOE RALPH, KEN MARSH, CHENGKUN HUANG, FANG FANG, CHRIS CLAYTON, CHAN JOSHI, University of California Los Angeles — In this paper the experimental results of spectral modulation of a self-guided laser pulse in an underdense plasma will be presented. Experiments were conducted using an ultrashort laser pulse ($\sim$50 fs) generated from the UCLA Ti:Sapphire laser system capable of delivering up to 10 TW of power. A gas jet was used to create a dense column of helium gas which the laser pulse ionized and self-guided through. By varying the laser pulse width, laser energy, gas jet density and gas jet length, different physical mechanisms of self-guiding were explored. In these experiments the guided laser pulse was spectrally and spatially resolved using a .25 m imaging spectrograph with 1.2 nm spectral resolution and 13 μm spatial resolution. Evidence of photon acceleration / deceleration due to the laser pulse interacting with density oscillations of a plasma wakefield will be presented and compared to simulation results. Additionally using the imaging spectrograph the percentage of the laser energy that was self-guided was determined.

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Date submitted: 18 Jul 2007 Electronic form version 1.4