

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Multiphoton-generated localized electron plasma for membrane permeability modification in single cells**<sup>1</sup> T. MERRITT, M. LEBLANC, J. MCMILLAN, J. WESTWOOD, G.A. KHODAPARAST, Virginia Tech — Successful incorporation of a specific macromolecule into a single cell would be ideal for characterizing trafficking dynamics through plasmodesmata or for studying intracellular localizations. Here, we demonstrate NIR femtosecond laser-mediated infiltration of a membrane impermeable dextran-conjugated dye into living cells of *Arabidopsis thaliana* seedling stems. Based on the reactions of fluorescing vacuoles of transgenic cells and artificial cell walls comprised of nanocellulose, laser intensity and exposure time were adjusted to avoid deleterious effects. Using these plant-tailored laser parameters, cells were injected with the fluorophores and long-term dye retention was observed, all while preserving vital cell functions. This method is ideal for studies concerning cell-to-cell interactions and potentially paves the way for introducing transgenes to specific cells.

<sup>1</sup>This work was supported by NSF award IOS-0843372 to JHW, with additional support from and U.S. Department of Agriculture Hatch Project no. 135997, and by the Institute of Critical Technology and Applied Sciences (ICTAS) at Virginia Tech.

Giti Khodaparast  
Virginia Tech

Date submitted: 12 Nov 2013

Electronic form version 1.4