Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Pulse-shaping and Fourier Transform Techniques in Multiphoton Microscopy JENNIFER OGILVIE[1], DELPHINE DÉBARRE, EMMANUEL BEAUREPAIRE, ANTIGONI ALEXANDROU, MANUEL JOFFRE, Laboratoire d'Optique et Biosciences, Ecole Polytechnique — Multiphoton microscopy is an important tool that is increasingly used in biological research. The ease with which broadband femtosecond pulses can be created and manipulated has opened up new directions for enhancing multiphoton microscopy. In particular, pulse-shaping techniques can tailor broadband light to selectively excite fluorescent species.[1] Here we demonstrate the use of pulse-shaped excitation to enhance multiphoton fluorescence imaging of live drosophila embryos. Other promising multiphoton techniques include coherent anti-Stokes Raman scattering (CARS) microscopy, which offers endogenous contrast based on the inherent vibrations of different chemical species.[2] Most implementations of CARS microscopy image single vibrational modes, providing limited ability to simultaneously follow multiple chemical species. An alternate time-domain Fourier transform-based method can produce spectrally resolved CARS images over the considerable bandwidth of a broadband laser source, This approach provides straightforward removal of the nonresonant background from CARS images while offering a compact, single-laser approach. [1] V. V. Lozovoy et al. J. Chem. Phys, (2003) 118, 3187. [2] A. Zumbusch et al. Phys. Rev. Lett. (1999) 82 4142.

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Date submitted: 06 Dec 2005 Electronic form version 1.4