

Abstract Submitted  
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**Multiphoton Microscope for Shaped Pulse Microscopy**<sup>1</sup> MICHAEL MURPHY, BRETT J. PEARSON, Dickinson College, THOMAS WEINACHT, Stony Brook University — Multiphoton microscopy is a developing field in which ultrashort laser pulses are used to drive multiphoton processes in a (typically) biological specimen. Multiphoton microscopy can have many advantages over traditional confocal microscopy, including a well-defined excitation volume, deeper sample penetration, and reduced specimen damage. Additionally, the broadband laser sources used in multiphoton microscopy allow one to shape the excitation pulse to selectively drive different processes. We are constructing a multiphoton microscope to be used for shaped pulse microscopy in an undergraduate research laboratory. Although the initial design will be for two-photon imaging of fluorescent proteins, the arrangement could be adapted for other forms of multiphoton microscopy as well (e.g. third-harmonic). By incorporating a broadband pulse shaper into the optical design, we will be able to seek closed-loop discrimination between different fluorescent samples. Furthermore, the use of a two-dimensional SLM in a Fourier-based pulse shaper should allow for fast switching between pulse shapes.

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