1027-44-99 **Sarah K Patch*** (patchs@uwm.edu), PO Box 413, Dept of Physics, Milwaukee, WA 53201.
Thermo/Photo/Opto-Acoustic Tomography and Relativistically Acausal Acoustic Absorption Models.

Thermo/photo/opto-acoustic tomography (TPOAT) are hybrid imaging techniques exploiting the thermo- and photo-acoustic effects. TPOAT imaging, assuming ideal data, is a solved internal source problem. In reality, outgoing acoustic pulses created during TPOAT excitation attenuate as they travel, severely degrading reconstructed image quality. Developing a robust attenuation correction scheme led the author to a more fundamental paradox.

Widely accepted frequency power law models for acoustic absorption are known to be relativistically acausal, instantaneously smearing impulse response functions throughout space. A physically consistent remedy providing a relativistically causal absorption model remains an open question—as does a physically consistent correction scheme for ultrasound absorption.

We will demonstrate the impact of acoustic attenuation on reconstructed images using simulated data. We will also compare measurements* of pulses propagated through highly absorbing oil to the standard attenuation model as well as higher order models.

* Data collected in the labs of T. Varghese, UW-Madison Medical Physics and G. Paltauf, U Graz Physics (Received February 20, 2007)