1116-35-998 **Rachel Grotheer***, Department of Mathematical Sciences, O-110 Martin Hall, Box 340975, Clemson, SC 29634. *Towards a Better Image: The Hyperspectral Diffuse Optical Tomography Inverse Problem.*

Medical imaging devices play an increasingly significant role in disease diagnosis and detection. Diffuse optical tomography (DOT), which uses a low-energy light source in the visible to near infrared range, has become a popular alternative to traditional imaging techniques. The use of non-ionizing light and its ability to penetrate soft tissue, makes DOT an attractive option for breast cancer detection and neonatal brain imaging, for example. DOT uses the diffusion approximation of the radiative transport equation, an elliptic PDE, to model the diffusion of photons in the tissue during the imaging process. The DOT inverse problem is to create an image by reconstructing a spatial map of the optical parameters of the tissue being imaged given a known source and boundary measurements. In recent years, researchers have sought to apply hyperspectral imaging, the use of hundreds of optical wavelengths in the imaging process, to DOT in order to improve the resolution of the image by adding new information. In hyperspectral DOT (hyDOT), the optical parameters have both spatial and spectral dependence, adding an extra dimension to the inverse problem. We present an overview of how the spectral dependence of the optical parameters affects the image reconstruction problem of hyDOT. (Received September 15, 2015)