

Abstract Submitted  
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**Instrumentation of Molecular Imaging on Site-Specific Targeting Fluorescent Peptide for Early Detection of Breast Cancer**<sup>1</sup>

PING YU, Department of Physics and Astronomy, University of Missouri, LIXIN MA, Department of Radiology and Biomolecular Imaging Center, University of Missouri — In this work we developed two biomedical imaging techniques for early detection of breast cancer. Both image modalities provide molecular imaging capability to probe site-specific targeting dyes. The first technique, heterodyne CCD fluorescence mediated tomography, is a non-invasive biomedical imaging that uses fluorescent photons from the targeted dye on the tumor cells inside human breast tissue. The technique detects a large volume of tissue (20 cm) with a moderate resolution (1 mm) and provides the high sensitivity. The second technique, dual-band spectral-domain optical coherence tomography, is a high-resolution tissue imaging modality. It uses a low coherence interferometer to detect coherent photons hidden in the incoherent background. Due to the coherence detection, a high resolution (20 microns) is possible. We have finished prototype imaging systems for the development of both image modalities and performed imaging experiments on tumor tissues. The spectroscopic/tomographic images show contrasts of dense tumor tissues and tumor necrotic regions. In order to correlate the findings from our results, a diffusion-weighted magnetic resonance imaging (MRI) of the tumors was performed using a small animal 7-Tesla MRI and demonstrated excellent agreement.

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University of Missouri

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