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Wei Li, Yang Yang* (yangy5@msu.edu) and **Yimin Zhong**. *Fluorescence Ultrasound Modulated Optical Tomography in the Diffusive Regime*.

Fluorescence optical tomography (FOT) is an imaging technology that localizes fluorescent targets in tissues. FOT is unstable and of poor resolution in highly scattering media, where the propagation of multiply-scattered light is governed by the smoothing diffusion equation. We study a hybrid imaging modality called fluorescent ultrasound-modulated optical tomography (fUMOT), which combines FOT with acoustic modulation to produce high-resolution images of optical properties in the diffusive regime. The principle of fUMOT is to perform multiple measurements of photon currents at the boundary as the optical properties undergo a series of perturbations by acoustic radiation, in which way internal information of the optical field is obtained. We set up a mathematical model for fUMOT, prove well-posedness for certain choices of parameters, and present reconstruction algorithms and numerical experiments for the well-posed cases. This is joint work with Wei Li and Yimin Zhong. (Received August 17, 2018)