

Computational Methods in PhotoAcoustic Tomography

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Abstract: Photoacoustic Tomography (PAT) is an example of "Imaging with Coupled Physics". The forward model couples the propagation of light fluence from an external source with acoustic waves from an internal source, through absorption and local expansion of energy by biologically relevant chromophores. The inverse problem takes as a first step the reconstruction of sound sources from measured timeseries of acoustic pressure on a surface, and as a second step the quantitative estimation of chromophore concentration from the recovered initial pressure and the model of conversion from optical to acoustic radiation. Both these problems require, in general, efficient computational methods for modelling and reconstruction. In this talk I will discuss some recent developments in this area.