A Mathematical Direct and Inverse Model for Light-Sheet Microscopy

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We consider a mathematical model for light sheet microscopy based on the propagation of the laser as a Fermi pencil beam into the object. We also model the camera reception from the excited fluorescent material using the transport of photons. We prove the uniqueness of the recovery for the three-dimensional distribution of the fluorescent material using some non-standard backward uniqueness for the heat equation. We show some numerical examples of algebraic reconstruction using the proposed model.