

Photon Migration Through Multiple Layers of Biological Tissue

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Abstract

The modeling of light propagation through multiple layers of biological tissue are assessed & compared to the theoretical predictions by Perelman at al. [94 & 95] of the most-favorable-path (MFP). The MFP on which photons will be found can be obtained from the path of the net flux propagation using the diffusion equation. The diffusion equation is valid when studying diffuse light propagation, where photon scattering is much greater than the absorption, or at a sufficient distance from the light sources. The diffusion intensity and net flux through multiple layers of biological tissue were calculated using COMSOL Multiphysics. Variations in model parameters such as source-detector separation, absorption coefficient, scattering coefficient and the anisotropic were assessed and compared with the theoretical predictions of MFP.

Figures used in the abstract

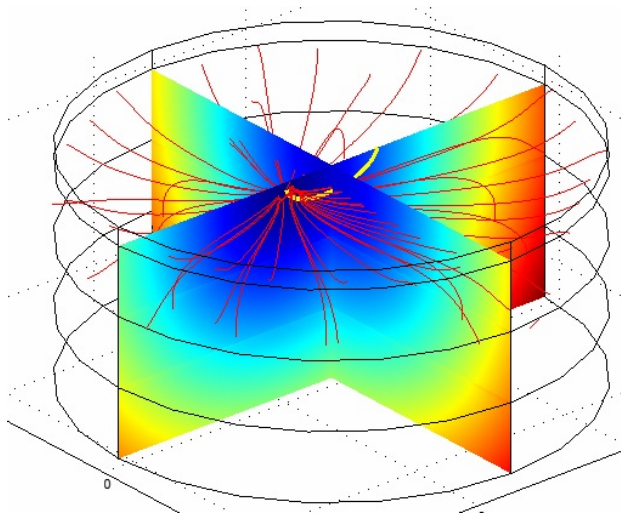


Figure 1: Image of multiple layered biological tissue media in which photon migration is assessed, a) slice plot of Diffuse Intensity, b) streamlines of flux, & c) theoretical prediction of MFP.

