

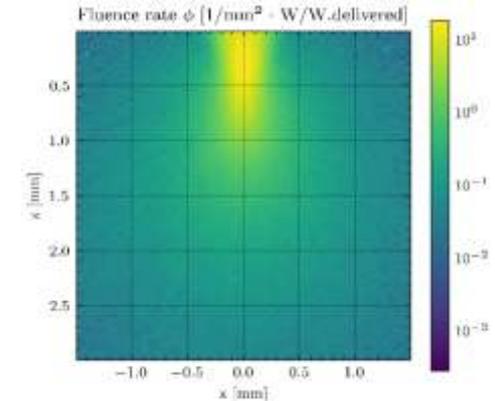
Simulating Light-Matter Interactions in Scattering Tissue

Motivation

Understanding how light interacts with scattering biological tissues is crucial for advancing optical imaging and therapeutic techniques. By simulating photon propagation in complex media, we can explore phenomena such as nonlinear interactions, including second harmonic generation (SHG), and their potential applications in biomedical optics.

This project focuses on leveraging Monte Carlo simulations to model light scattering, absorption, and nonlinear effects in tissues with varying optical properties. Additionally, we aim to simulate digital optical phase conjugation and SHG-guided wavefront shaping to enhance imaging depth and resolution in highly scattering environments.

If you are curious about the intersection of computational physics, optics, and biomedical applications, this project offers a unique opportunity to contribute to cutting-edge research in light-tissue interactions.



Tasks

- Develop and implement Monte Carlo simulations for photon propagation in tissue
- Model nonlinear optical second harmonic generation (SHG) interactions
- Analyze the impact of tissue parameters (scattering, absorption, ...) on light propagation.

Keywords

Monte Carlo Simulation, Photon Propagation, Scattering Tissue, Nonlinear Interaction

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