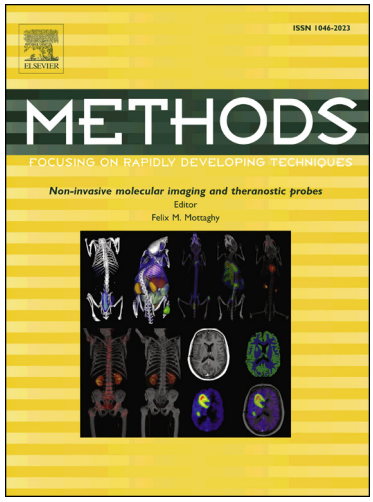

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Modeling the sub-diffraction focusing phenomenon of light propagation through scattering medium

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Abstract

Optical techniques are assuming greater importance in biomedical applications, however, due to extreme complexity involved in light propagation through scattering medium, it is very challenging to analyze experimentally. Here we report a two-stage simulation technique to simulate phase-conjugated light propagation through scattering medium with macroscopic dimensions. The reported simulation yields accurate information with flexibility to access research parameters. The proposed simulation method is suitable for finite-difference time-domain (FDTD) technique, pseudospectral time-domain (PSTD) technique, and other simulation techniques based upon numerical solutions of Maxwell's equations. We demonstrate modeling phase-conjugated light propagation through a scattering medium. The reported simulation technique is readily applicable to model the propagation of continuous-wave (CW) light with specific amplitude and phase through a scattering medium of macroscopic dimensions. More importantly, the flexibility of simulation enables analysis of research factors that are challenging to access experimentally.