FMM-GUIDED 3D IMAGE RECONSTRUCTION USING COMPRESSIVE SENSING

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ABSTRACT
Focal modulation microscopy (FMM) has been theoretically and experimentally demonstrated to be able to probe deeper inside scattering samples than confocal microscopy \cite{ref1}. However, the point scanning mode employed in FMM limits the imaging speed and restricts its application in dynamic imaging for live biological samples. On the other hand, 3D deconvolution microscopy provides fast imaging but the imaging volume is limited by out-of-focus light. Here we proposed FMM-guided 3D image reconstruction to enlarge the imaging volume while maintaining a fast imaging speed. To improve the contrast and resolution, we applied compressive sensing \cite{ref3} in reconstruction process for the samples with prior information, i.e. sparsity in a proper domain. The simulation results show benefits by applying compressive sensing in FMM-guided 3D imaging reconstruction.

![Image](image-url)

Figure 1: XY slices of (a) object, (b) blurred wide-field image with Gaussian noise (SNR=20), (c) image deconvolved by Wiener filter and (d) image reconstructed by compressive sensing.