

Imaging Analysis of the Target inside Turbid Media in Volume Holographic Imaging System

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Volume holographic imaging system is another alternative to confocal microscopy due to the properties of the volume holograms to image different depths of the sample. However, the resolution becomes worse as the imaging depth increases due to scattering light causing from sample itself.

The imaging property between conventional 4-f and 4-f geometry with volume hologram placed at the Fourier plane as the target is immersed inside turbid media is analyzed in this paper. We discuss the difference of the imaging quality of the target in the conventional 4-f and 4-f with volume hologram as the thickness of the turbid media increases in both systems. By utilizing the k-sphere method and Monte-Carlo ray tracing software, we present the simulation and the experiment results indicating how the light scattering by turbid media limits the imaging depth of volume hologram inside the imaging system.