

THE REDUCTION OF SPECIMEN-INDUCED SPHERICAL ABERRATION AND SCATTERING EFFECT IN A ZEEMAN LASER SCANNING CONFOCAL REFLECTION MICROSCOPE

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The specimen-induced spherical aberration and scattering effect result in the degradation on the quality of sectioning images in conventional confocal microscope (CCM). We have setup a Zeeman laser scanning confocal reflection microscope (ZLSCM) and conducted experiments in order to verify the capability of reducing two effects efficiently. Zeeman laser outputs linearly polarized photon-pairs (LPPP) laser beam in ZLSCM which is featured by the common-path propagation of LPPP and optical heterodyne detection [1]. And then, the capability of reducing the specimen-induced spherical aberration is anticipated. Simultaneously, with the features of three gatings (spatial filtering gating, polarization gating and spatial coherence gating) in ZLSCM, the scattering effect induced by specimens is reduced too based on wave consideration on scattering photon-pairs laser beam. In experiment, ZLSCM shows better axial resolution and lower siderobes compared with CCM. Finally, the ability of reducing the specimen-induced spherical aberration and scattering effect by ZLSCM was demonstrated and discussed.

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Reference

[1] H. F. Chang, C. Chou, H. F. Yau, Y. H. Chan, J. N. Yih and J. S. Wu, "Angular distribution of polarized photon-pairs in a scattering medium with a Zeeman laser scanning confocal microscope," *J. Microsc.*, **223**, 26-32 (2006).