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(국문/영문)기타소속:

국문 강연제목: 저반복률 광원을 이용한 SNR 향상 단일 대물렌즈 이광자 사선 광시트 현미경 개발

영문 강연제목: Development of an SNR-enhanced single-objective two-photon oblique light sheet microscope using a low-repetition-rate laser source

Abstract(영문):

Three-dimensional fluorescence imaging has become an essential tool in biomedical research, enabling visualization of complex biological structures. Conventional methods such as confocal and nonlinear microscopy provide optical sectioning but suffer from slow acquisition and phototoxicity. Light sheet microscopy offers faster imaging with reduced photodamage through selective plane illumination, yet its orthogonal dual-objective configuration limits applicability to small samples. Two-photon excitation (TPE) microscopy provides deeper tissue penetration and reduced scattering, but integrating TPE with light sheet illumination remains challenging due to low excitation efficiency. To overcome these limitations, we developed a single-objective two-photon oblique light sheet microscopy (TP-ob-LSM) employing a low repetition rate femtosecond laser. By redistributing pulse energy while maintaining the same average power, this system achieves efficient fluorescence excitation and high-quality 3D imaging. The oblique single-objective configuration further enhances sample compatibility, offering a promising tool for large-area, low-phototoxicity imaging of thick biological tissues.

Brief Biosketch (간단한 이력, 연구/대외활동 소개, 국문/영문)

송정근 박사는 한국과학기술원(KAIST) 기계공학과에서 박사학위를 취득하였으며, 현재 박사 후 연구원으로 활동 중이다. 저반복률 펄스 레이저를 이용한 이광자 사선 광시트 현미경 개발을 중심으로 연구활동을 하고 있으며, 고속·고품질 3차원 이광자 형광 이미징 기술을 연구하고 있다.

Dr. Jeonggeun Song received his Ph.D in Mechanical Engineering from KAIST and is currently a Postdoctoral Researcher. His research focuses on developing two-photon oblique light sheet microscopy using low-repetition-rate femtosecond lasers for high-speed, high-SNR three-dimensional two-photon fluorescence imaging in biomedical application.