

## Novel spinning disk microscope for 3D one- and two-photon excitation imaging.

Nicolai Pechstein , Andreas Deeg, Thomas Naiser, Kai Sparenberg, Stefan Laimgruber,  
Rainer Uhl

TILL I.D. GmbH, Am Klopferspitz 19a, 82152 Martinsried, Germany

Laser-based spinning disk microscopes concentrate light onto a rotating spot-pattern and send both excitation and emission light through the same pinhole. This way they enable fast 3D imaging of biological samples with low photo damage. In the present work we present a novel optical concept, which resembles our previous Andromeda-concept in that it employs a single disk only. In contrast to Andromeda and other spinning disk systems here only the emission light needs to pass through the pinholes, not the excitation light. This approach facilitates the microscope design, achieves higher light efficiency and permits imaging with larger pupil objectives than possible with conventional two-disk systems. We present fast 3D imaging with a setup designed for one photon excitation. In addition we show a realization of the concept that allows spinning disk microscopy with two-photon excitation.

