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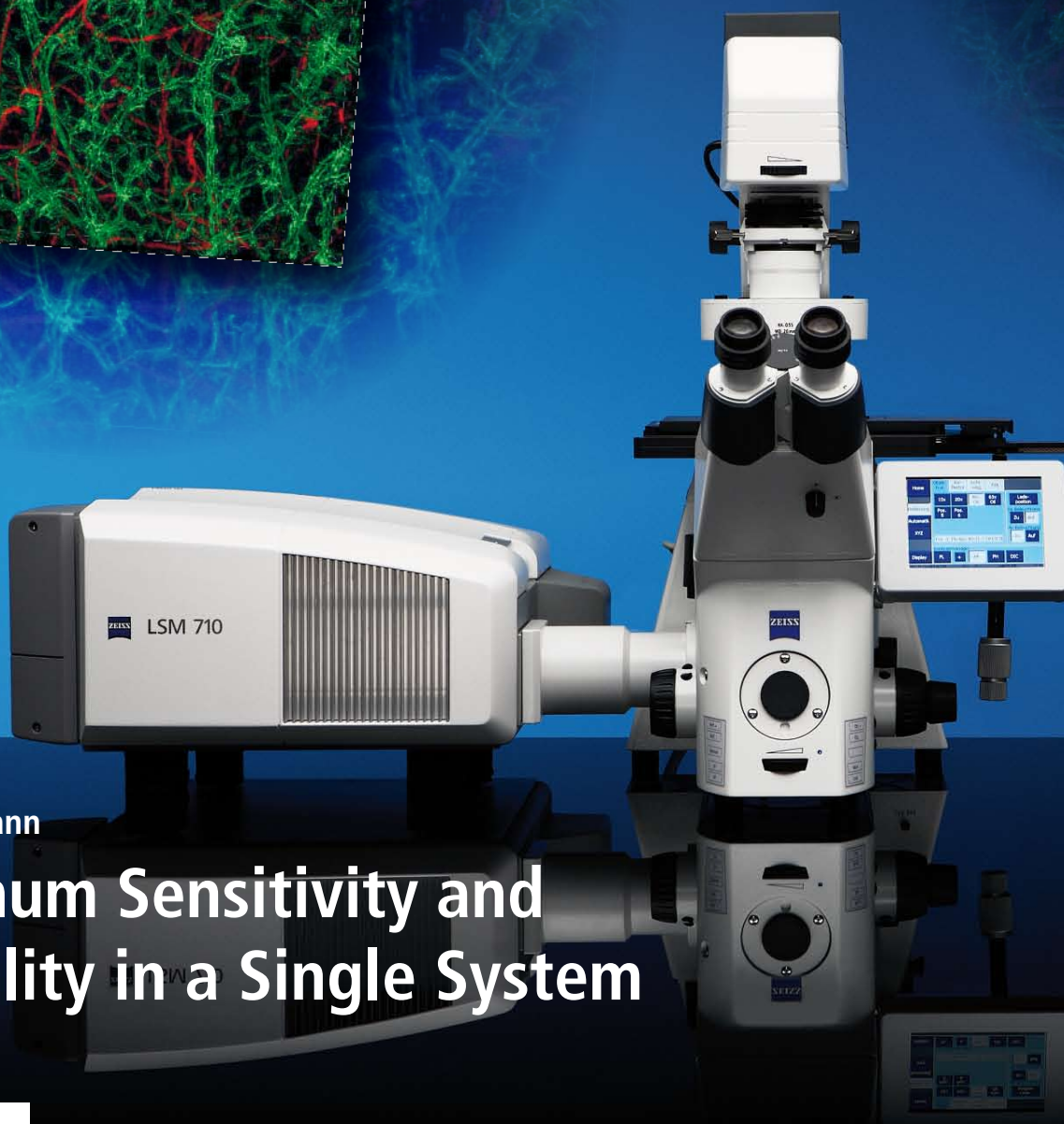
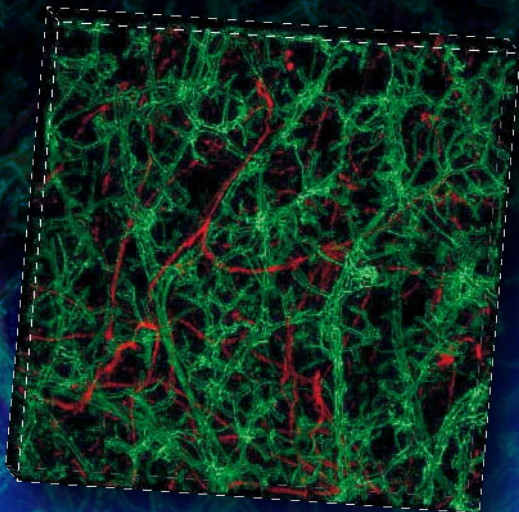
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TRENDS & TECHNIQUES IN LIFE SCIENCE RESEARCH

Reprint



Ralf Engelmann

Maximum Sensitivity and Flexibility in a Single System

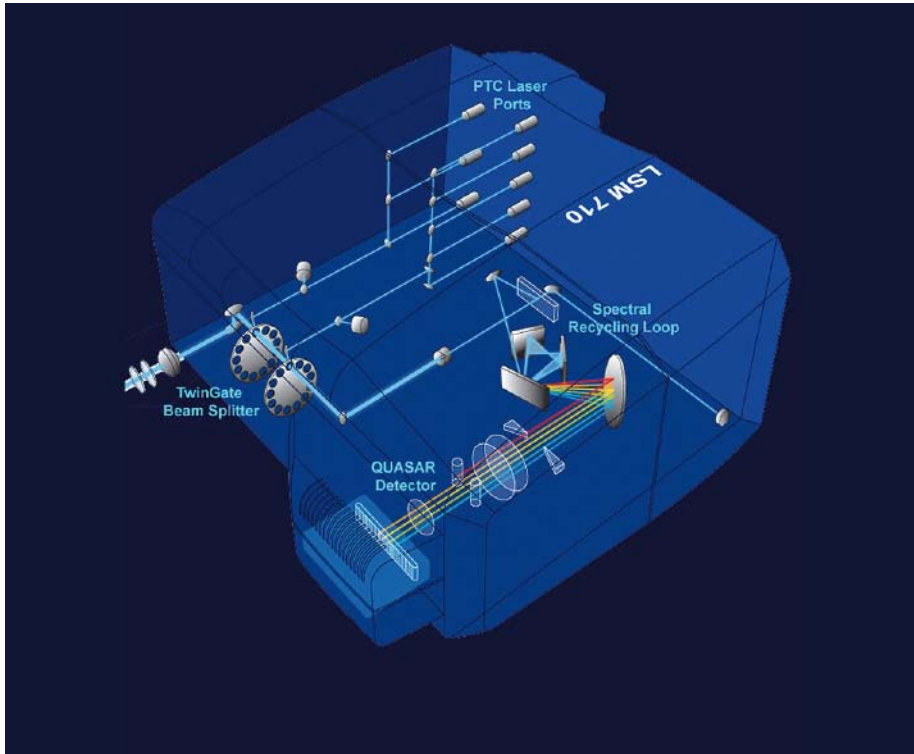


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Maximum Sensitivity and Flexibility in a Single System



With the LSM 710 Laser Scanning Microscope, Carl Zeiss is defining new standards for sensitivity and flexibility in examining fluorescent biological specimens.

ments as well as new multiphoton detectors for deeper optical penetration into biological structures, the system can give new impetus to all areas of biological research. Further hallmarks of the LSM 710 are its unique precision and repro-

ducibility as well as its markedly easier operation.

Complete New Construction and Innovative Design Solutions

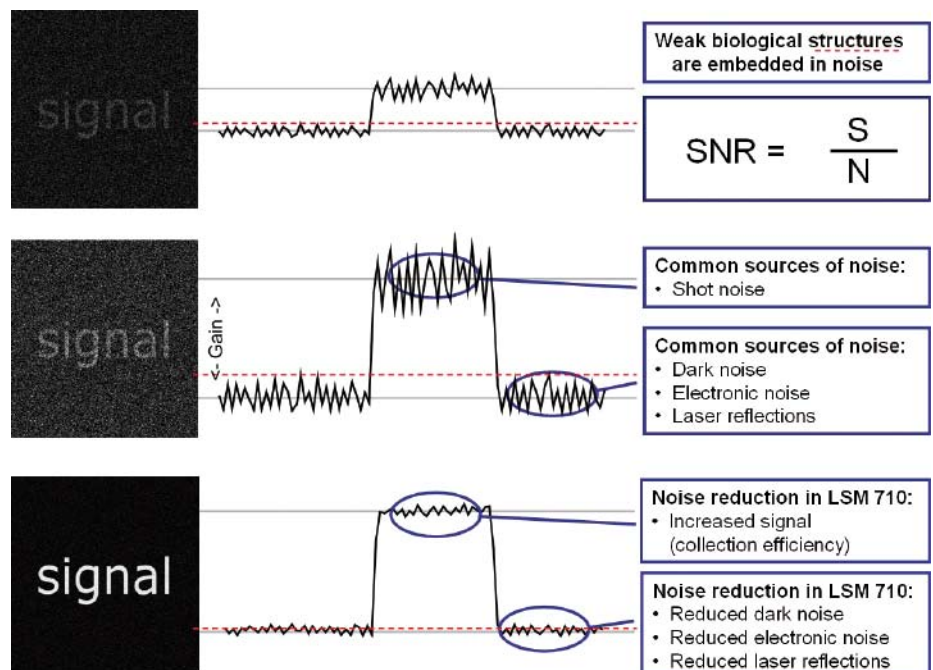
The benefits of the LSM 710 include the PTC laser design, which no longer requires a laser module and enables flexible combinations and fast upgrading of various lasers from near UV to the IR range. The innovative TwinGate main beam splitter concept supports up to 50 laser line combinations, features individually exchangeable filters and offers unparalleled suppression of the excitation laser light for brilliant, high-contrast images.

The new QUASAR detector, configured with 2, 3, or 34 channels, is more sensitive and flexible than any previous detector system and offers spectral resolution of down to 3 nm. A spectral recycling loop increases the efficiency of the spectral separation of fluorescence light emitted by the sample to almost 100%.

Innovative analysis methods such as FLIM measurements with switchable ps/cw laser diodes or integrated image correlation spectroscopy (RICS) make it possible to extract quantitative information about molecule concentrations and mobility directly from the confocal images recorded.

Thanks to numerous technological innovations in optical and electronic design and software architecture, confocal fluorescence microscopy with the LSM 710 becomes much more efficient, easy, and fast. This is a further milestone as the technical innovations of the LSM 710 provide new possibilities in research conducted with living, multi-labelled cells.

The system's outstanding sensitivity and better signal-to-noise ratio ensure high-contrast, detailed images even of complex specimens such as thick, living tissue samples. The new illumination and detection design provides full freedom in the selection and simultaneous imaging of up to ten fluorescence signals. The basis is a filter-free spectral detection unit, which can be continuously set over the entire wavelength range from 390 to 750 nm. With improved flexibility for new fluorescence dyes and multimodal experi-



Looking Deep into the Tissue – Multiphoton Microscopy without Compromise

With the LSM 710 NLO Laser Scanning Microscope, Carl Zeiss is providing basic and biomedical research with improved femtosecond multiphoton technology which enables neurobiologists, developmental biologists, immunologists, and plant biologists to examine complex biological systems without compromise.

The special applications of the LSM 710 NLO are the acquisition of high-resolution images of fluorescent structures in living animals and thick tissue specimens, long-time observation of development processes and functional imaging in combination with the photomanipulation of fluorescent structures. The high signal-to-noise ratio provided by the system ensures brilliant imaging of cellular and sub-cellular details, even in deep-lying tissue layers. For the first time, up to five fluorescence signals can now be recorded simultaneously in what is called the non-descanned mode.

The basis of the new LSM 710 NLO system are highly

sensitive, non-descanned detectors for multiphoton microscopy featuring optimised optics, electronics, and detector positioning. Furthermore, a special version of a non-descanned detector with GaAsP technology and signal decoupling directly above the objective lens results in a further doubling of sensitivity.

Depending on the microscope stand, up to ten non-descanned detectors can be used in reflected and transmitted light with simultaneous operation. Further benefits include the scanning module's optimised transmission especially in the IR wavelength range up to 1100 nm and the possibility of combining the multiphoton laser with any other laser line, including lasers with emission in the near UV range. In the non-descanned detectors, the filters can be freely combined and exchanged by the user as required.

User Friendly Operation and Self Maintenance

Complete integration of the system control into the ZEN 2008 software platform en-



sures efficiency and maximum specimen protection.

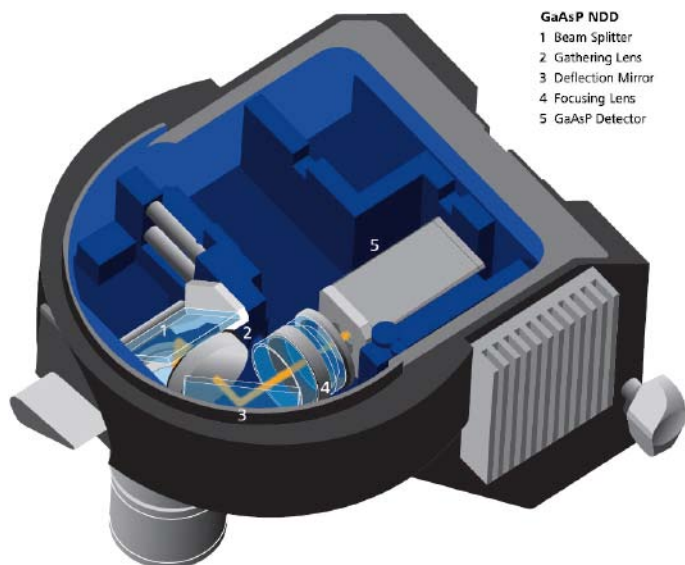
Automated software tools for system calibration and the control of the key performance parameters are always available to users and ensure that the LSM 710 operates in the optimum performance range at all times.

The Smart Setup function of the ZEN 2008 software, a tool for dye-centered instrument configuration, is another system highlight which makes image acquisition faster and easier than ever before. The optimal acquisition strategy for fastest speed or best signal is automatically calculated by the software and suggested to the user.

The LSM 710 Laser Scanning Microscope can be combined with upright and inverted Axio microscope stands, plus the brand-new fixed stage microscope Axio Examiner from Carl Zeiss. Also, a LSM 5 LIVE scanning module can be added on these

stands, for extremely fast image acquisition. With such a LSM 7 DUO system, e.g. fast Ca²⁺ imaging at >100 frames per second with ROI manipulation or multiphoton uncaging of caged compounds is available.

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