



Confocal Microscopy

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Confocal microscopes are powerful tools for three-dimensional imaging on the submicron scale and, when combined with fluorescence and/or Raman spectroscopy, can yield local information about chemical composition and structural details. Because of the tight focus of the excitation lasers within the laser confocal luminescence microscope, these instruments offer the opportunity to manipulate materials.

Working with such a system, our team at Lehigh University in Bethlehem, Pa., developed a technique to produce strong, local, electric space-charge fields that enable the inducement of a domain inversion in ferroelectric lithium niobate and direct write of almost arbitrary domain patterns. This technique will have impact on the production of nonlinear optical devices such as periodically poled lithium niobate (PPLN) based frequency converters.

Volkmar Dierolf is an associate professor in the Physics Dept at Lehigh University and a member of the Center for Optical Technologies at Lehigh. He is an internationally known expert in optical spectroscopy and microscopy of insulating materials and semiconductors. He obtained his Ph.D from the University of Utah and a habilitation from the University of Paderborn, Germany.