

# Multimodal nonlinear optical polarizing microscopy of long-range molecular order in liquid crystals

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We demonstrate orientation-sensitive multimodal nonlinear optical polarizing microscopy capable of probing orientational, polar, and biaxial features of mesomorphic ordering in soft matter. This technique achieves simultaneous imaging in broadband coherent anti-Stokes Raman scattering, multiphoton excitation fluorescence, and multiharmonic generation polarizing microscopy modes and is based on the use of a single femtosecond laser and a photonic crystal fiber as sources of the probing light. We show the viability of this technique for mapping of three-dimensional patterns of molecular orientations and show that images obtained in different microscopy modes are consistent with each other. © 2010 Optical Society of America

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