



Second harmonic generation polarimetry of biological tissues

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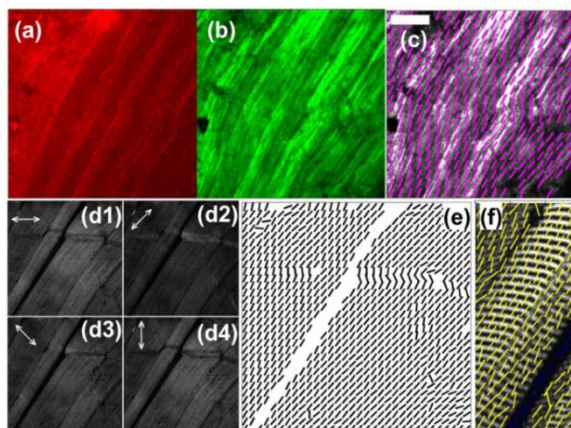
Introduction

Second harmonic generation (SHG) is a nonlinear coherent optical process induced by intense laser radiation in non-centrosymmetric structures. SHG microscopy has been usefully implemented for biomedical imaging so as to reveal complex macromolecular arrays, including collagen and myosin fibrillar proteins. Owing to its close relationship with the anisotropy of the nonlinear medium, SHG is strongly dependent on the polarization of the excitation laser beam. Thus, polarimetric features of SHG provide meaningful information for advanced characterization of biological tissues.

Results and Discussion

In this presentation, technological aspects, main applications and future outlook² of SHG polarimetric methods implemented in the context of biological imaging will be discussed.

Figure 1: Orientation fields of myosin fibers in fresh veal muscle¹



Bibliography

¹C. Odin, T. Guilbert, A. Alkilani, O. P. Boryskina, V. Fleury, and Y. Le Grand, "Collagen and myosin characterization by orientation field second harmonic microscopy," *Opt. Express*, 2008, 16, 16151-65.

²M. Dubreuil, S. Rivet and Y. Le Grand, "Snapshot second harmonic generation polarimeter based on spectral analysis", *Optics Letters*, 2017, 42(22), 4639-4642