

Abstract Submitted
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Determination of Frank-Oseen parameters in collagen using polarization modulated second harmonic signal. CLAYTON BRATTON, University of California, Davis - Physics, KAREN REISER, University of California, Davis - Neurosurgery, ANDRE KNOESEN, DIEGO YANKELEVICH, MINGSHI WANG, University of California, Davis - Electrical and Computer Engineering, ISRAEL ROCHA - MENDOZA, Cardiff University, Cardiff, Wales - Cardiff School of Biosciences — A method is presented for determining the Frank-Oseen parameters for the elastic modulus of collagen based on analysis of polarization-modulated second harmonic signal (PM-SHG). The liquid crystal structure of collagen and its associated order parameter, the director field, were characterized in samples of tendon and annulus fibrosus. Deformation of the director field caused by controlled stress loading or heating was assessed. Three distinct curvature strains—splay, twist, and bend—were determined, using the PM-SHG data. This optical technique permits highly localized determination of the three major elastic deformations.

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