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Multimode Analysis of SHG Signal from Complex Biological Systems: Parameterization of Regional and Global Features. CLAYTON BRATTON, Dept.of Physics, Univ. of California, Davis, KAREN REISER, Dept.of Neurological Surgery, Univ. of California, Davis, ANDRE KNOESEN, DIEGO YANKELEVICH, MINGSHI WANG, Dept. of Electrical and Computer Eng., Univ. of California, Davis, ISRAEL ROCHA-MENDOSA, Cardiff School of Biosciences, Univ. of Cardiff, Wales — We have continued development of our novel computational approach for quantifying structural disorder in biomolecular lattices with nonlinear susceptibility based on analysis of polarization-modulated second harmonic signal. Local disorder at the level of molecular organization is identified using a novel signal-processing algorithm sufficiently compact for near real-time analysis. Global and regional disorder within the biostructure is characterized using two-dimensional wavelet transform of the magnitude and phase of the second harmonic signal. Results suggest our signal processing method represents a robust, scaleable tool that allows us to detect both regional and global alterations in signal characteristics of biostructures with a high degree of discrimination.

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