Abstract template:

Title

Sum Frequency Generation: An Introduction plus Recent Developments and Current Issues

Reference

in Advances in Multiphoton Proc. Spec.; Lin, S. H., Villaeys, A. A. and Fujimura, Y., Ed.; (World Scientific: Singapore, Japan, 2008); Vol. 18, pp 133-200.

Authors

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Abstract

Nonlinear spectroscopy, both second harmonic and sum frequency generation – SHG and SFG – have proven to be powerful techniques for probing a variety of interfaces from the very dynamic, high vapor pressure liquid-air surface to buried interfaces between hydrophobic and hydrophilic phases to irregular and amorphous solid surfaces. With the advent of off-the-shelf laser systems, it has become easier and easier to collect nonlinear spectra. The major impediments to wide spread usage of nonlinear spectroscopy are the challenges in interpretation of the spectra produced. This work begins with an introduction to nonlinear spectroscopy based on an optical-geometrical view of the interaction between the probe beams and molecules in the interfacial region. The introduction serves as a basis for exploration of recent developments and current issues. Two case studies are included: examination of ions at the aqueous interface including evidence for H_3O^+ at the interface and investigation of molecular interactions on nonmetallic, nanostructured interfaces.