Non-Linear spectroscopies (CARS,stRg and SFG) for the investigation of Biological Systems.

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Waveguide spontaneous Raman scattering (WspR), Waveguide coherent anti-Stokes Raman scattering (WCARS), infrared-visible sum frequency generation (IV-SFG) and stimulated Raman gain (stRg) and multichannel polaristion sensitive CARS (MPSCARS) are developed and applied to investigate biological systems adsorbed at surfaces and in solution.

The study of proteins and protein-lipid systems adsorbed at surfaces in a monolayer is of special interest. Our approach in the development of spRs [1] and CARS [2] is the combination of these techniques with waveguides. This may also be the preferred method for stRg [3,4] to detect monolayers. Results will be shown of Waveguide CARS and Waveguide spontaneous Raman scattering. Monolayers of proteins at surfaces can be detected with Waveguide spontaneous Raman scattering.

Broadband CARS is combined with polarisation sensitive measurements to vary the contribution of the various $\chi^{(3)}$ - components. Simultaneous fitting of the CARS spectra gives accurate results about the vibrational band parameters. Broadband CARS results of proteins in solution will be presented.

References

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