Fourier transform coherent anti-Stokes Raman scattering spectroscopy

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Advantages of FT CARS:

- direct, simple method: obtain time-delay data, Fourier transform
- usable with single source
- easy access to resonant and non-resonant signal

$$\begin{array}{c} \omega_{i} \\ \omega_{i}$$

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Fourier-transform CARS (FT CARS) microscopy Ogilvie et al.: Opt. Lett. 31(4), 480-482, 2006







Fourier-transform CARS (FT CARS) spectroscopy Ideguchi et al.: arXiv, 1403.3814, 2014







Similar setup: Time-resolved CARS (T-CARS) microscopy Volkmer et al.: Appl. Phys. Lett 80(9), 1505-1507, 2002







Similar setup: Nonlinear interferometric vibrational imaging (NIVI) Marks et al.: Appl. Phys. Lett 92(12), 123905, 2004





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Similar setup: CARS interferometer/interferometric CARS microscopy Evans et al.: Opt. Lett 29(24), 2923-2925, 2004







Similar setup: Heterodyne CARS microscopy Potma et al.: Opt. Lett 31(2), 241-243, 2006









FT CARS spectroscopy will be constructed in Tokushima Univ., which would like to be combined with dual comb spectroscopy for gas analysis in the future Ideguchi et al.: arXiv, 1403.3814, 2014



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OSCILLOSCOPE

Confirmation of repetition rate from each output and time delay of pulses from both outputs











Cross-correlation signal indicates the overlapping (temporally and spatially) of pulses from both outputs

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Next steps:

- considering the beam divergence, especially from the tunable output

- preparing sample (solid/liquid) and its container
- trying to get CARS interferogram and spectra of the sample



