FREE INDUCTION DECAY FROM CARBONYL SULFIDE IN THE THZ SPECTRAL RANGE.

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A typical pump-probe pulsed THz set-up have been used for Time Domain Spectroscopy experiment in order to investigate free induction decay in carbonyle sulfide (COS).[a] In the detected time domain signal, a transmitted pulse followed by commensurate transients pulses is observed. The molecules of COS respond to the terahertz excitation by reradiating a Free Induced Decay (FID) pulses : the molecules absorb the incident pulse and then a periodic rephasing and dephasing of the entire 60 excited equally spaced transitions occurs during the FID.[b] Therefore the sample emits a series of terahertz pulse at the rate equal to the frequency separation between adjacent lines of 2 B, where B is the rotational constant,. The coherent transient pulse are so observe mainly in the case of linear or symmetric molecules. A model[b] based on Maxwell-Bloch equation has been employed to estimate parameters such as the transition linewidth, the rotational and centrifugal distortion constant with the temporal form.

[a] Y. Cai, I. Brener, J. Federici *Appl. Phys. Lett.*, **77**, (2076),1997

[b] H. Harde, S. Keiding, D. Grischkowsky *Phys. Rev. Lett.*, **66**, (1834),1991