

OBSERVATION OF
LONGITUDINAL-TRANSVERSE
SPLITTING IN RAMAN SCATTERING
SPECTRA OF LIQUID CHLOROFORM

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S u m m a r y

On the basis of the fluctuation-dissipative theory by using the known optical constants, the characteristics of the transverse and longitudinal optical (TO and LO) modes for vibrations $\nu_5(E)$ of liquid chloroform are obtained. To find the LO-TO splitting of vibration modes of liquids, the Liddan - Sacks - Teller relation is proposed to be applied. The experimental investigations of the shape of the vibrational band $\nu_5(E)$ in the Raman scattering (RS) spectrum of liquid CHCl_3 and the numerical expansion in elementary spectral components are performed. The observed splitting of 18 cm^{-1} at room temperature is in good agreement with the performed theoretical calculations. The analysis of possible mechanisms of splitting of the vibrational band and comparing to the doublet splitting of a crystalline state of CHCl_3 allow one to assume that this splitting is the LO-TO splitting of thermal vibrational excitations of liquids. The existence of the LO-TO splitting can explain the asymmetry and structure of spectral bands and the difference of frequencies of the same modes in RS and IR spectra of liquids. The determination of frequencies of the TO and LO modes will allow one to find an unharmonicity of vibrations.