

LOW-FREQUENCY COLLECTIVE MODES  
OF THE SYSTEM OF HYDROGEN  
BONDS IN WATER

*N. E. Kornienko*

Taras Shevchenko Kyiv National University,  
Faculty of Physics  
(6, Academician Glushkov Prosp., Kyiv 03127, Ukraine)

S u m m a r y

The calculations of low-frequency transverse and longitudinal optical modes of water are carried out basing on the fluctuation-dissipative theory and using data on the optical constants  $n$  and  $\kappa$ . The results of experimental investigations of the low-frequency Raman spectra of light water and deuterioxide in the region  $50 - 350 \text{ cm}^{-1}$  with using special numerical methods for treatment spectra allowed us to determine TO and LO frequencies:  $\nu_{\text{TO}} = 180 \div 210 \text{ cm}^{-1}$  and  $\nu_{\text{LO}} = 270 \div 290 \text{ cm}^{-1}$ . The experimentally observed value of LO-TO splitting is in a good agreement with the theory. The factors which are a reason for collectivization of thermal oscillations in liquids are analyzed.