

Abstract:

Study of recombination of molecular ions in cold plasma plays a key role in our understanding of chemical kinetics in interstellar space or in upper layers of planetar atmospheres. Various metods are used for its study of which important part is laser absorption spectroscopy. Concentration or temperature of measured ions can be found from their absorption spectra.

In the presented work two spectroscopic techniques are briefly introduced - Cavity ringdown spectroscopy and Laser induced reaction technique. Main mechanisms for spectral linewidth broadening are described and from absorption spectra of H_3^+ and N_2^+ ions measured by above-mentioned techniques their kinetic temperature is discovered. Because it is affected by spectral width of applied laser diodes, a part of this work also deals with description of its measurement by self-heterodyne method or Fabry-Pérot interferometer. The spectral width is found for infrared diode DFB laser.