Theory of Molecular Lineshapes in the Submillimeter Spectral Region

This lecture will present the theory of submillimeter, molecular-absorption lineshapes in the gas phase. Background derivation of equations describing molecular lineshapes will be given, as well as their physical interpretation. As such, the lecture is a tailored synthesis of material covered by advanced, graduate-level, spectroscopy textbooks and important journal articles. The absorption lineshape of carbon-monoxide in the submillimeter will be used as a case-study to guide the discussion, demonstrate the application of theory to data analysis, as well as to summarize the current state of knowledge (on CO lineshapes) represented by recent journal articles.