HIGH RESOLUTION INFRARED SPECTRUM OF THE B-H STRETCHING REGION OF $^{10}B_2H_6$

W. J. LAFFERTY, *Optical Technology Division, National Institute of Standards and Technology, Gaithersburg, MD 20899*; J.-M. FLAUD, *Laboratoire de Photophysique Moléculaire, CNRS, Université Paris-Sud, F-91495 Orsay Cedex, France*; H. BÜRGER AND G. PAWELKE, *Anorganische Chemie, FB 9 Universität-GH, D-42097, Wuppertal, Germany*.

One of the most favorable atmospheric window regions for the detection of extraterrestrial diborane is the B-H stretching region which covers the 2475 to 2730 cm^{-1} region. Two very strong fundamental vibrations fall in this region, ν_{16}, an a-type band centered at 2525 cm^{-1} and a b-type band, ν_8, centered at 2623 cm^{-1}. Since these are the highest frequency bands of the molecule and diborane has numerous low frequency modes, there are many dark states in this region, and both bands are found to have numerous perturbations–some local and some more global. Despite this, the two bands have been assigned and fit to nearly the experimental uncertainty by invoking numerous crossings of various dark states.

In addition to the fundamental vibration there are three very weak a-type bands which fall nearby; whose tentative vibrational assignments are: $\nu_3 + \nu_{18}$ at 2355 cm^{-1}, $\nu_4 + \nu_{17}$ at 2412 cm^{-1}, and $\nu_3 + \nu_{17}$ at 2795 cm^{-1}. These bands are also badly perturbed and their analysis is ongoing.