# PRESSURE BROADENING AND SHIFT OF SOME $NH_3$ LINES MEASURED BY DIODE LASER SPECTROSCOPY

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Using the stabilized diode laser spectrometer in Cologne we have precisely determined pressure-induced line broadening and line shift coefficients of six rovibrational transitions in the $\nu_2$ band of $NH_3$. Foreign gas effects due to $O_2$, $N_2$, $H_2O$, CO, He, and Ar have been investigated and the self-effects as well.

The high accuracy in the frequency position of the laser was achieved by stabilizing the diode laser on an interference maximum of a Fabry-Perot interferometer of variable optical length. The laser frequency was swept by tuning the cavity length of the étalon; the cavity length was monitored by a stabilized HeNe laser. A simultaneous recording of an $NH_3$ spectrum with a reference cell at a fixed pressure has been introduced for an absolute calibration. The line positions relative to reference lines have been measured to a precision of 300 kHz. A good signal-to-noise ratio was achieved by using a Herriott-type multi-reflection cell with a total path length of 46.86 m. This allowed to use very small $NH_3$ partial pressures of the order of a few hundred $\mu$bar in the measurements of foreign gas effects to minimize the influence of $NH_3$ self-effects.

It turned out that contamination of the gas sample with $H_2O$ imposed a serious problem upon the precise determination of the pressure effects, because of the large shift and broadening caused by $H_2O$. To remove any residual water contamination, the sample cell was connected to a cold finger submerged in a Dewar vessel filled with dry ice. The results of the present study are thus thought to be the most precise data of this kind now available.