COMBINED MILLIMETER WAVE AND FTIR SPECTRA OF DN_3

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We have recently observed the infrared spectrum of DN_3 at a resolution of 0.0009 cm^{-1}using the synchrotron at the Canadian Light Source between 30 and 5000 cm^{-1}at several pressures between 1 and 100 mTorr. A special heavy walled stainless steel apparatus was constructed to perform the synthesis of the highly toxic and explosive substance on site in way that met the stringent safety standards of the facility. We have also measured the millimeter wave spectrum of DN_3 at Wisconsin and at Prague covering altogether the range from 130-730 GHz. We are working toward combining all this spectral data to achieve a global eight state fit with SPFIT. While the many perturbing interactions between these lowest eight vibrational states cause somewhat less dramatic shifts than the same ones do in HN_3, it remains a very challenging problem in spectroscopy. A substantial additional complication in this isotopologue though is the fact that it has proved to be impractical to obtain an isotopically pure sample of DN_3 because of facile H/D exchange on the walls of the absorption cells employed. This makes it desirable at least to assign the HN_3 spectrum first, so that the corresponding features can be eliminated from consideration in the DN_3 work.