HELIUM PRESSURE BROADENING OF HCN BETWEEN 1 AND 25 K

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We have used a collisional cooling apparatus to measure the pressure broadening of the HCN j = 2–1 transition at temperatures between 1 and 25 K. At these temperatures only a small number of rotational states are kinetically accessible, and therefore exact pressure broadening cross sections can be calculated from a binary potential energy surface (PES). Several generations of the HCN-He PES have been calculated. The accuracy of a PES is assessed primarily by its ability to reproduce the spectrum of the dimer bound states. The bound states, by definition, only sample the attractive well in the PES. Pressure broadening is a scattering phenomenon and therefore depends strongly on the repulsive wall and to a lesser extent on the attractive well. We will present our measurements and compare them to the predictions from several proposed PESs.