COLLISION BROADENING OF NH_3 BY D_2 FROM 15 K TO 40 K

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We report low temperature pressure broadening cross sections for the (J, K) = (1, 1), (2, 2) and (3, 3) inversion transitions of NH_3 broadened by molecular deuterium from 15 to 40 K. These D_2 broadening studies serve to complement our earlier work on the low temperature pressure broadening of NH_3 by He, normal-H_2 and para-H_2. While D_2 has nearly the same mass as He, its electronic structure is similar to H_2. Owing to its greater mass and consequent decreased velocity relative to H_2, the expectation is that cross sections for NH_3 collisions with D_2 will be smaller than cross sections for H_2 at a given temperature or energy. However, experimentally we find the NH_3-D_2 cross sections are larger than for broadening by normal-H_2, $J = 0$, para-H_2 and He.