TEMPERATURE DEPENDENCE OF THE DIPOLE-DIPOLE COLLISION CROSS SECTION OF $^{13}CH_3F$

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For molecules with permanent electric dipole moments, the most rapid energy transfer process is due to dipole-dipole collisions which induce $\Delta J = \pm 1$ transitions. Although this process is the dominant contributor to pressure broadening, little is known about the temperature dependence of the process. We have used a time resolved pump/probe technique based on infrared-millimeter/submillimeter wave double resonance spectroscopy to measure the temperature dependence of the dipole-dipole and higher-order multipole cross sections in $^{13}CH_3F$. The measurements were performed over a temperature range of 200K to 400K. The experimental results are compared with the temperature scaling predicted by Anderson, Tsao and Curnette theory and the statistical power gap law.