COLLISIONAL CROSS-SECTIONS AT LOW TEMPERATURES: A COMPARISON OF EXPERIMENTAL RESULTS WITH THEORY

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There has been a longstanding discrepancy between experimental measures and theoretical calculations of collisional cross-sections at low temperatures (below 10 K). These discrepancies have only sharpened with technological improvements in both experimental and theoretical techniques. Recent measurements of Helium pressure broadened hyperfine transitions of HCN have provided us with a better measurement of our experimental precision and reduced our experimental uncertainty to two percent. Yet pressure broadening cross-sections remain several standard deviations from calculated values below 20 K. We will examine recent experimental and theoretical results for pressure broadening, pressure shifting, inelastic transition rates and diffusion cross-sections performed at low temperature.