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Rovibrational quenching of rotationally-excited CO by helium[1]
T.G. HEIL, P.C. STANCIL, University of Georgia, R.C. FORREY, Penn. State University, Berks-Lehigh Valley College, N. BALAKRISHNAN, University of Nevada Las Vegas — Collisional quenching of molecular species is an important process in a variety of astrophysical environments including interstellar clouds, photodissociation regions, and cool stellar/planetary atmospheres. Further, it may prove interesting to study molecular collisions at cold and ultra-cold temperatures as schemes are currently being developed to efficiently cool and trap neutral polar molecules. In this work, quantum mechanical scattering calculations will be presented for the rovibrational relaxation of rotationally-excited CO due to collisions with He for collision energies between 10^{-5} and $\sim$500 cm^{-1}. The calculations were performed using the close-coupling approach and the l-labeled form of the coupled-states approximation. The accurate HeCO interaction potential surface of Heijmen *et al.* was adopted and numerical CO wave functions are utilized in the calculation of the potential coupling matrix elements. State-to-state and total cross sections for the quenching of CO will be presented with an emphasis on highly-excited initial rotational levels. Comparisons will be made to previous calculations and measurements where available.

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