Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Predicting high-j, high-energy collisional rate coefficients for the H-CO system using ultracold scattering calculations[1] KYLE WALKER, Univ. of Georgia, LEI SONG, Radboud University Nijmegen, BENHUI YANG, Univ. of Georgia, GERRIT GROENENBOOM, AD VAN DER AVOIRD, Radboud University Nijmegen, BALAKRISHNAN NADUVALATH, UNLV, ROBERT FORREY, Penn State - Berks, PHILLIP STANCIL, Univ. of Georgia — Collisional excitation rate coefficients of carbon monoxide with light colliders such as H, H_2, He, and electrons are necessary to produce accurate models of many astrophysical environments. CO, the second most abundant molecule in the universe after molecular hydrogen, has an excitation temperature of just $\sim$5.5 K for its lowest rotational transition, and so it can be collisionally excited to high rotational levels in moderately energetic environments. However, in these regions it is not appropriate to assume a thermal population of levels, and therefore collisional rate coefficients must be provided to model the non-thermal gas. We present a zero-energy scaling technique for predicting rate coefficients for CO($v = 0, j$) deexcitation induced by H for temperatures below 3000 K for transitions from $j = 1 - 70$ to all lower j' levels, where j is the rotational quantum number. We use explicit quantum scattering calculations and our predicted rates to form the most extensive set of collisional excitation rate coefficients for the H-CO system.

[1]This work partially supported by NASA grant NNX12AF42G.

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Date submitted: 30 Jan 2015 Electronic form version 1.4