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Rotational energy transfer in CH_4 collisions with He atoms[1] BENHUI YANG, PHILLIP STANCIL, University of Georgia — Methane is an active constituent in the Earth's atmosphere, is one of the important greenhouse gases, is an important species in the atmospheres of T dwarfs, and is likely present in the carbon-rich atmospheres of circumstellar shells. Quantitative determinations of state-to-state cross sections and rate coefficients for the CH_4-He scattering system are therefore of interest for numerical models of atmospheric and astrophysical environments. In this work, quantum close-coupling and coupled-state approximation scattering calculations for quenching of rotationally excited CH_4 due to collisions with He are performed for collision energies between 10^{-7} and 3000 cm^{-1} using the MP4 potential of Calderoni *et al.* [J. Chem. Phys. **121**, 8261 (2004)]. State-to-state cross sections and rate coefficients from selected initial rotational states of CH_4 in symmetries A, E and F are presented. Comparison of cross section with available theoretical results and experimental data are also presented.

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