

# Rotational relaxation of H<sub>2</sub>S by collision with He

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**Context.** The H<sub>2</sub>S molecule has been detected in several regions of the interstellar medium (ISM). The use of non-LTE models requires knowledge of accurate collisional rate coefficients of the molecules detected with the most common collider in the ISM. **Aims.** The main goal of this work is to study the collision of H<sub>2</sub>S with He. **Methods.** A grid of ab initio energies was computed at the coupled cluster level of theory including single, double, and perturbative triple excitations (CCSD(T)) and using the augmented correlation consistent polarized quadruple zeta (aug-cc-pVQZ) basis set supplemented by a set of mid-bond functions. These energies were fitted to an analytical function, which was employed to study the dynamics of the system. Close coupling calculations were performed to study the collision of H<sub>2</sub>S with He. **Results.** The rate coefficients determined from the close coupling calculation were compared with those of the collision with H<sub>2</sub>O+He, and large differences were found. Finally, the rate coefficients for the lower rotational de-excitation of H<sub>2</sub>S by collision with He are reported. © 2020 ESO.

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