

ExoMol line lists XXV: a hot line list for silicon sulphide, SiS

Apoorva Upadhyay,¹ UCL

The ExoMol project aims to provide line lists of spectroscopic transitions for key molecular species that are likely to be important in the atmosphere of extrasolar planets and cool stars. This is essential for the continued exploration of newly discovered astrophysical objects such as exoplanets, for which there is an increasing desire to characterize their atmospheric compositions. In this poster I will discuss the methodology of the ExoMol project, using silicon sulphide (SiS) as an example.

SiS has long been observed in the circumstellar medium of the carbon-rich star IRC+10216 CW Leo. In our work, comprehensive and accurate rotation–vibrational line lists and partition functions are computed for 12 isotopologues of silicon sulphide in its ground electronic state. The calculations employ an existing spectroscopically accurate potential energy curve (PEC) derived from experimental measurements and a newly computed ab initio dipole moment curve (DMC). The SiS line list for the parent isotopologue includes 10 104 states and 91 715 transitions. These line lists are available from the ExoMol website.

¹a.upadhyay.16@ucl.ac.uk