LINE POSITIONS, INTENSITIES AND LINEWIDTHS OF $^{12}C^{32}S_2$, $^{13}C^{32}S_2$, $^{32}S^{12}C^{33}S$ AND $^{32}S^{12}C^{34}S$ ISOTOPOLOGUES

EKATERINA KARLOVETS, IOULI E GORDON, ROBAB HASHEMI, ROBERT HARGREAVES, *Atomic and Molecular Physics, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA*; ROMAN KOCHANOV[a], *Laboratory of Theoretical Spectroscopy, Institute of Atmospheric Optics, Tomsk, Russia*; ANDREY MURAVIEV, DMITRII KONNOV, KONSTANTIN L VODOPYANOV, *CREOL, The College of Optics & Photonics, University of Central Florida, Orlando, Fl, USA*.

Line list including line positions, intensities and broadening parameters for $^{12}C^{32}S_2$, $^{13}C^{32}S_2$, $^{32}S^{12}C^{33}S$ and $^{32}S^{12}C^{34}S$ isotopologues have been calculated using the PGOPHER program [b].

A global least-squares fit of the large set of measured line positions available in the literature to the corresponding spectroscopic parameters G_v, B_v, D_v and H_v was performed, including the most recent high-precision dual-comb laser spectroscopy measurements carried out at the University of Central Florida. A unique set of parameters for each lower and upper states were obtained. Spectroscopic constants provide energy levels for transitions. The line intensities were fit to the models derived from recent high-resolution measurements wherever possible. For the bands where no intensity measurements exist, we have used scaling factor in order to model corresponding PNNL[c] cross-sections. As an example, more than 54100 $^{12}C^{32}S_2$ line positions and intensities of cold and hot bands up to J=150 have been calculated.

Semi-empirical models for rotational dependence of air- and self-broadened half widths are developed based on the available experimental data.

The obtained results allow improving the knowledge of spectroscopic properties of the carbon disulfide in atmospheric environmental chemistry, medical diagnostics and planetary atmospheres. In consequence of importance, this line list of CS_2 will be included in the upcoming 2020 version of the HITRAN spectroscopic database.

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[a] Tomsk State University, Laboratory of Quantum Mechanics of Molecules and Radiative Processes, Tomsk, Russia.

[b] Colin M.Western. JQSRT, Vol. 186, pp.221-242 (2017).

[c] Steven W.Sharpe, Timothy J. Johnson et al. Applied Spectroscopy, Vol.58, pp.1452-1461 (2004).