Abstract Submitted
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Computation of Collision-Induced Absorption by dense Hydrogen-Helium gas mixtures up to Thousands of Kelvin, for Astrophysical Applications[1] MARTIN ABEL, LOTHAR FROMMHOLD, The University of Texas at Austin, XIAOPING LI, KATHARINE L.C. HUNT, Michigan State University — The interaction-induced absorption by collisional pairs of H_2 molecules is an important opacity source in the atmospheres of the outer planets and cool stars. The emission spectra of cool white dwarf stars differ significantly in the infrared from the expected blackbody spectra of their cores, which is largely due to absorption by collisional H_2–H_2, H_2–He, and H_2–H complexes in the stellar atmospheres. Using quantum-chemical methods we compute the atmospheric absorption from hundreds to thousands of kelvin, as required, for example, in astrophysical analyses of objects, including cool white dwarf stars, brown dwarf stars, M dwarfs, cool main sequence stars, solar and extra-solar planets, and the formation of so-called first stars [1]. Comparisons of our calculations with laboratory measurements, which exist only at room temperature and below, show close agreement.

[1] Martin Abel, Lothar Frommhold, Xiaoping Li, and Katharine L. C. Hunt, "Collision-Induced Absorption by H_2 pairs: From Hundreds to Thousands of Kelvin," J. Phys. A, 2011, 115 (25), pp 6805-6812

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