

Abstract Submitted
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Collision-Induced Infrared Absorption by Molecular Hydrogen Pairs at Thousands of Kelvin MARTIN ABEL, The University of Texas at Austin, KATHARINE L.C. HUNT, XIAOPING LI, Michigan State University, LOTHAR FROMMHOLD, The University of Texas at Austin — The interaction-induced absorption by collisional pairs of H₂ molecules is an important opacity source in the atmospheres of the outer planets and cool stars.¹ The emission spectra of cool white dwarf stars differ significantly in the infrared from the expected black-body spectra of their cores, which is largely due to absorption by collisional H₂—H₂, H₂—He, and H₂—H complexes in the stellar atmospheres. Using quantum-chemical methods we compute the atmospheric absorption from hundreds to thousands of kelvin. Laboratory measurements of interaction-induced absorption spectra by H₂ pairs exist only at temperatures below 300 K. We show that our results reproduce these measurements closely so that our computational data permit reliable modeling of stellar atmosphere opacities even for the higher temperatures. This work has been supported in part by the National Science Foundation through Grants AST-0709106 and AST-0708496.

¹L. Frommhold, *Collision-Induced Absorption in Gases*, Cambridge University Press, Cambridge, New York, 1993 and 2006

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