

Abstract Submitted
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Photodissociation of CS and SiO from Excited Rovibrational Levels¹ P. C. STANCIL, R. J. PATTILLO, University of Georgia, B. M. MCLAUGHLIN, J. F. MCCANN, Queen's University Belfast, R. C. FORREY, Penn State University, J. F. BABB, ITAMP, Harvard-Smithsonian CfA — Photodissociation due to ultraviolet (UV) photons is a dominant molecular destruction process in a variety of UV-irradiated interstellar (IS) environments. While most astrochemical models adopt photodissociation rates computed from cross sections out of the molecule's ground rovibrational level ($v = 0, J = 0$), they also assume a standard local IS radiation field and opacity due to standard IS dust. However, none of these conditions are satisfied in a host of environments including photodissociation regions, protoplanetary disks, and outflows from AGB stars. To allow for the calculation of reliable photodissociation rates, we compute cross sections from all bound v, J levels of the ground electronic state for two example molecules, CS and SiO. The cross sections are computed for a large number of excited electronic states using a two-state fully quantum perturbation approach. New ab initio potential energies and transition dipole moment functions, used in the photodissociation calculations, were obtained at the MRCI+Q level of theory using the quantum chemistry package MOLPRO. Applications of the v, J -state-resolved cross sections will be presented as well as LTE photodissociation cross sections which assume a Boltzmann distribution of initial v, J levels.

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