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CRITICAL ATOMIC PARAMETERS IN THE CALCULATION OF SOLAR C I-IV AND O I-VI EMISSION LINES

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High quality solar spectra are available throughout the wavelength range 67 to 173 nm, exhibiting emission lines which are formed in the solar chromosphere, transition region, and corona. Calculations of the emission line profiles can be carried out by solving the statistical equilibrium and radiative transfer equations, with an assumed model of the temperature and density structure of the atmosphere. The atmospheric model is derived as giving the best match between the calculated and observed spectrum. The calculations depend on atomic line strengths and broadening parameters, collisional excitation and ionization rates (collisions with hydrogen atoms as well as electrons), photoionization and autoionization cross sections, dielectronic recombination rates, and on molecular rates and cross sections. We show representative calculated emission line profiles of C I-IV and O I-VI, in comparison with the observed solar profiles, and indicate the most important rates and cross sections that affect the calculated results.