

Lifetimes and Oscillator Strengths for Ultraviolet Transitions in P II, Cl II, and Cl III

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Abstract

Oscillator strengths for transitions in P II, Cl II, and Cl III are derived from lifetimes and branching fractions measured with beam-foil techniques. The focus is on the multiplets with a prominent interstellar line at 1154 Å in P II which is seen in spectra of hot stars, and the lines at 1071 Å in Cl II and 1011 Å in Cl III whose lines are seen in spectra of diffuse interstellar clouds and the Io torus acquired with the *Far Ultraviolet Spectroscopic Explorer*. These data represent the first complete set of experimental f -values for the lines in the multiplets. Our results for P II λ 1154 agree well with Curtis' semi-empirical predictions, as well as the large-scale computations by Hibbert and by Tayal. The data for Cl II λ 1071 also agree very well with the most recent theoretical effort and with Morton's newest recommendations. For Cl III, however, our f -values are significantly larger than those given by Morton; instead, they are more consistent with recent large-scale theoretical calculations. Extensive tests provide confirmation that LS coupling rules apply to the transitions for the multiplets in Cl II and Cl III.

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