THE PHOTOIONIZATION CROSS-SECTION OF SI

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An experiment for the determination of the absorption spectrum of SI was performed using a flash-pyrolysis technique.

The material (pure Sulphur) was introduced by vacuum deposition into the absorption cell which was surrounded by a helical flash-lamp. A condensor bank of 120 μF charged to 10 kV was discharged through the flash-lamp. The absorption of the strong flux of light results in the evaporation of the material and in its dissociation. With delays of 100–500 μsec a Garton source was fired providing the background continuum.

About 100 new lines due to SI were observed and classified. The absorption spectrumis dominated by resonances due to states $3s^2 3p^3\ nl$ going to the $3s^2 3p^3(^2D^0)$ and $(^2P^0)$ limits of SII mixing with the continua joining the $(^4S^0)$ limit and autoionizing into it.

Several of these resonances have been unfolded and parameters were determined according to the Fano-Cooper theory. A comparison of the experimentally derived cross-section with a theoretical prediction due to Conneely *et al* (1970) shows a general agreement but several discrepancies, especially in the parameters of the resonances, remain.

Reference

Conneely, M.J., Smith, K. and Lipsky, K.: 1970, *J. Phys. B. Atom. Molec. Phys.* **3**, 493.

DISCUSSION

G. Mehlman-Balloffet: Did you measure line parameters for the autoionizing transitions?

G. Tondello: Yes. Parameters according to the Fano and Cooper theory were measured for about a dozen lines.

G. Mehlman-Balloffet: Did you use the isolated line approximation or did you take into account configuration interaction?

G. Tondello: Use was made of a computer program developed at Harvard which is designed to unfold the contributions of up to 10 autoionizing lines to the cross-section. The computer program however assumes an isolated line approximation.

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