PHOTOIONIZATION OF GASES

IN THE EXTREME ULTRAVIOLET

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ABSTRACT

The main goal of this thesis is the measurement of the total photoionization cross section of gases, principally Ar, O_2 and N_2, from approximately 200 to 600 Å, that is, in the Extreme Ultraviolet (EUV). The present aim is to reduce errors associated with the experimental acquisition of data and to achieve cross sectional results with total relative errors of less than ± 3%.

The emphasis of the experimental work was on the construction of a pulsed power supply capable of delivering peak currents of the order of a thousand amperes for use with a condensed spark discharge lamp, the design and implementation of an electrometer, built from discrete components, and a computer interface board.

Radiation from the lamp was dispersed by a grazing incidence monochromator before being passed into a double ionization chamber. The ion currents produced by the absorption of EUV radiation in the double ion chamber were grounded through their respective electrometers, whose readings used with other physical measurements, results in the total photoionization cross section being determined.

STATEMENT

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of the my knowledge and belief, contains no material previously published or written by any other person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

SIGNED: .....**DATE:** 25/10/96

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