

A DIRECT MEASUREMENT OF THE COLLISIONAL POPULATION
AND DEPOPULATION RATES FOR THE $n = 2$ STATE OF
ATOMIC HYDROGEN

By

D.D. Burgess, G. Kolbe and J.M. Ward

The Blackett Laboratory, Imperial College of Science and
Technology, London SW7 2BZ

A technique is described in which a plasma is prepared using a tunable laser such that the population of only a single atomic bound state differs significantly from its equilibrium value. Subsequent observation of the relaxation of this single state in the absence of laser irradiation and with all other levels close to their equilibrium populations then yields unambiguous values for the collisional depopulation and re-population rates for the level, free from uncertainties present e.g. in laser-induced fluorescence experiments.

Results will be presented for the $n = 2$ state of hydrogen, but the technique is applicable to many first excited states in plasmas which need not be in either LTE or pure coronal equilibrium.