Collisional Radiative Model of Polarisation Resolved Spectroscopy of Laser Produced Cu Plasmas Emission

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ABSTRACT

Polarisation resolved emission spectroscopy (PRES) from a laser-produced copper plasma has been studied for a variety of background pressures. The discrete line emission of both copper neutral particles was found to be significantly less polarised than the nearby continuum. We used traditional laser produced plasma diagnostics to measure the electron densities and temperatures. These parameters were then used to seed a collisional-radiative model in order to determine the dominant recombination processes present in the plasma that contribute to the partial polarisation of the emission. As the recombination radiation (RR) rate is larger than the free-free rate, the anisotropic continuum polarisation emission is as the results from the transfer of the anisotropy of the electron velocity distribution function (EVDF) and hence the directed motion of electrons into partially polarised recombination radiation plasmas.

KEY WORDS

PRES- Polarisation Resolved Emission Spectroscopy- Bismuth Sillenite Crystals

LIBS: Laser Induced Breakdown Spectroscopy

RR: Radiative recombination rate

EVDF: Electron Velocity Distribution Function