Bulgarian Journal of Physics 27 Supplement 1 (2000) 150–152

SHIFT MEASUREMENT IN SOME IONIZED ARGON AND NITROGEN SPECTRAL LINES

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Abstract. The profile of some ArII, ArIII, and NII spectral lines were measured in dense Z - pinch plasma. The experimental shift of spectral lines is measured in electron density of plasma source of $4{,}662 \times 10^{17}$ cm^{-3} and $4{,}823 \times 10^{17} cm^{-3}$ and plasma temperature of 32 800 K. The results are compared with theoretical data were they exists. Some of lines showed blue and some red shift.

Introduction

By measuring the profile [1] and the shift of ionized spectral lines is possible to make some conclusions on the structure of initial and final energy level of the transition and on the path of the transition. Some authors had indicated that the spectral line may may changue the wavelength due to effects of the external field on initial and final energy level of the transition [2,3].

Experimental

The experiment and the method of measurements are described in paper [1]. The shift of some lines in multiplets ArII, ArIII, and NII has been determined throughout comparisons of the experimental profile with the theoretical wavelength of lines from the literature [4,5].

Results

In the following table are presented the results of the shift of some ArII, ArIII, and NII lines.

Multiplet	λ [nm]	Half width [nm]	Shift [nm]
ArII,			
Mult. 6, $^4P - {}^4P^0$	484,78	0,163	0,00
Mult. 44 $^4P^0 - {}^4D$	350,970	0,101	0,00
	351,440	0,107	0,01
	353,578	0,110	-0,01
Mult. 56 $^4D^0 - {}^4F$	357,661	0,178	
ArIII			
Mult. 1 $^5S^0 - {}^5P$	328,585	0,075	-0,03
	330,188	0,068	0,028
	331,125	0,076	0,001
Mult. 6 $^3P^0 - {}^3P$	339,185	0,065	-0,04
Mult. 3 $^3D^0 - {}^3F$	333,613	0,079	0,020
	334,472	0,070	-0,001
	335,849	0,074	-0,041
NII			
Mult. 12 $^1P^0 - {}^1D$	399,50	0,138	0,045
Mult. 15 $^1P - {}^1D^0$	444,70	0,185	-0,034
Mult. 20 $^3D - {}^3D^0$	480,33	0,136	0,000
Mult. 39 $^3F^0 - {}^3G$	404,13	0,341	0,023

Conclusions

In this method of determinations of the spectral lines shift are included all experimental errors, but this measurements gives some estimations on the shift of spectral lines due to influence of external field, especially for the lines of ionized atoms while the shift of the neutral and single ionized lines are negligible.

References

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