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STUDYING THE UV LINE PROFILE OF C IV, S IV AND O IV IN THE SPECTRUM QSO J031828.9-001523.1

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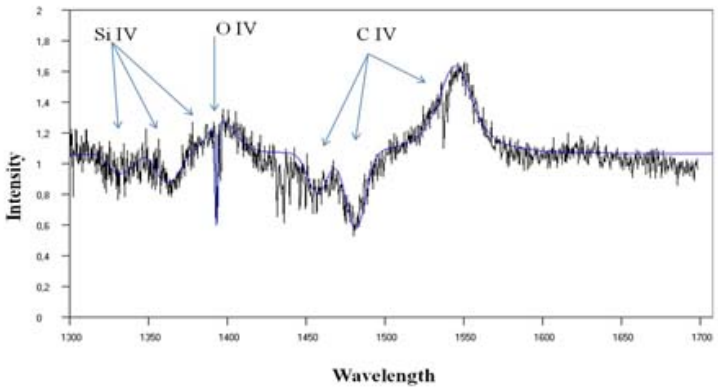
Abstract: In this work, using the GR model, we analyze the UV CIV and SiIV resonance lines and the absorption line of OIV in the spectrum of quasar J031828.9-001523,1. We study the presence and behavior of absorption and emission clouds analyzing their characteristics. From this analysis we can calculate the values of a group of physical parameters, such as the apparent rotational and radial velocities, the random velocities of the thermal motions of the ions, the Full Width at Half Maximum (FWHM), the optical depth, as well as the absorbed energy and the column density of the independent regions of matter which produce the main and the satellites clouds of the studied spectral lines.

1 Data and Method

We obtained the spectrum of the BALQSO-J031828.9-001523.1 from the SDSS database. Some basic characteristics of this quasar are given below in the Table of figure 1.

In this paper, using the GR Model [2], [3] we calculate some kinematical properties, such as the apparent rotational, and radial velocities as well the random velocities of the thermal motions of the ions, the Full Width at Half Maximum (FWHM), the absorbed energy and the column density.

The method is the following one: The line function of this complex profile includes as parameters many physical conditions that create the line profile. Giving values to these parameters we found the most appropriate in order to take the best theoretical fit of the observed line profile. We concluded that the theoretical values of the physical parameters are the right ones which describe the physical conditions in the region that produces the specific spectral line. In Figure 1 below we represent the normalized intensity and the fit.



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SpecObjID	116472199451246592
RA-DEC (decimal)	49.6205, -0.256436
Plate	413
Mjd	51929
fiberId	170
Z	1.98447

Figure 1: Basic characteristics about the quasar J031828.9-001523.1. The black line shows the normalized intensity and the blue line shows the fit. We observe the O IV absorption line, too. We fitted emissions with Voight distribution and absorptions with GR distribution.

2 Results

We detected two absorption components and one emission for the C IV and two absorption lines and one emission line for the Si IV. Furthermore, there is one O IV absorption line. The emission lines are fitted with Voight distribution and the absorption lines are fitted with GR distribution. We present the results arising from the best fit in Table 2, where the random and rotational velocities, the radial velocity, the Full Width at Half Maximum (FWHM), the column density, the absorbed energy and the optical depth are given.

Line	Fit	Vrand (Km/sec)	Vrot (Km/sec)	Vrad (Km/sec)	FWHM	CD (10^{10}/cm^2)	Eabs (eV)	V MIX	Opt. Depth	S
C IV (1548.187)	Voigt	-	14	-929.480	26.040	7.302	8.0084	1.5	0.360	1
	RG	1346.101	50	-13167.610	14.604	-2.591		5.9	0.280	-
	RG	1346.101	50	-17815.000	14.274	-1.450		5.9	0.150	-
C IV (1550.772)	Voigt	-	14	-927.930	25.835	6.643	7.995	1.5	0.324	1
	RG	1343.857	50	-13145.660	14.578	-2.511		5.9	0.270	-
	RG	1343.857	50	-17785.300	14.217	-1.245		5.9	0.127	-
Si IV (1393.755)	Voigt	-	8	-215.100	15.091	7.502	8.8957	5.7	0.160	1
	RG	1267.163	10	-7528.405	12.094	-4.731		5.9	0.150	-
	RG	1267.163	40	-13981.320	11.989	-3.210		2.8	0.100	-
Si IV (1402.770)	Voigt	-	8	-213.710	15.016	6.466	8.8385	5.7	0.136	1
	RG	1259.020	10	-7480.023	12.046	-4.079		5.9	0.127	-
	RG	1259.020	40	-13891.470	11.957	-2.760		2.8	0.085	-
O IV (1401.156)	RG	226.885	1	-1711.689	2.504	-7.655	8.8487	0.9	1	-

Figure 2: Fitting parameters of C IV, Si IV and O IV lines.

References

[1] Borguet B., and Hutsemekers, D.: 2010, A polar+equatorial wind model for broad absorption line quasars: I. Fitting the C IV BAL profiles.

[2] Danezis, E., Nikolaidis, D., Lyratzi, E., Stathopoulou, M., Theodossiou, E., Kosionidis, A., Drakopoulos, C., Christou, G., and Koutsouris P.: 2003, A New Model for the Structure of the DACs Regions in the Oe and Be stars, Ap&SS,284.1119.

[3] Danezis E., Nikolaidis, D., Lyratzi, E., Popovic, L.C., Dimitrijevic, M.S., Antoniou, A., and Theodosiou, E.: 2007, A new model for the structure of the DACs and SACs regions in the Oe and Be stellar atmospheres.

[4] Knigge, C., Scaringi, S., Goad, M.R., and Cottis, C.E.: 2008, MNRAS, 368, 1426.

[5] Lyratzi E., Danezis, E., Popovic, L.C., Antoniou, A., Dimitrijevic M.S., and Stathopoulos, D.: 2011, The complex broad absorption line profiles in a sample of QSO spectra.