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Stark broadening of spectral lines of multicharged ions of astrophysical interest. VI. C IV lines of large principal quantum number

M.S. Dimitrijević¹ and S. Sahal-Bréchot²

¹ Astronomical Observatory, Volgina 7, 11050 Beograd, Yugoslavia

² Laboratoire "Astrophysique, Atomes et Molécules", Département Atomes et Molécules en Astrophysique, Unité associée au C.N.R.S. N°812, Observatoire de Paris-Meudon, 92190 Meudon, France

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Abstract. — Using a semiclassical approach, we have calculated electron-, proton-, and ionized helium-impact line widths and shifts for 69 C IV multiplets of large principal quantum number. This comprehensive set of data has been used for the investigation of Stark broadening parameter regularities within spectral series.

Key words: lines: profile — atomic and molecular data.

1. Introduction.

We have recently calculated Stark broadening data for 39 C IV multiplets (Dimitrijević & Sahal-Bréchot 1991ab), persuaded that we had provided data for practically all C IV lines important for stellar research. Our tables however are not sufficiently complete for the investigation of PG 1159 stars (Werner *et al.* 1991; Werner & Heber 1991). The PG 1159 stars are not hydrogen deficient pre-white dwarfs with effective temperature 100,000 - 140,000 K and peculiar chemical composition. Carbon and helium are the dominant constituents ($C/He = 0.5$) (Werner *et al.* 1991). Due to the high surface gravity ($\log g = 7$) Stark broadening is an important line broadening mechanism and Stark broadening data are needed for NLTE model atmosphere analysis (Werner *et al.* 1991) and other stellar plasma investigations (see e.g. Dimitrijević 1989 or Kršljanin & Dimitrijević 1992). In this class of stars a number of large principal quantum number C IV lines not included in our previous analysis were observed recently (Werner *et al.* 1991; Werner & Heber 1991). Moreover, Stark broadening data in the far and extreme ultraviolet, for lines originating from transitions between energy levels with large principal quantum number and low lying levels will become important for astrophysics in the near future. The Extreme Ultraviolet Explorer (EUVE) mission will provide the all sky survey in the $\lambda = 70 - 700 \text{ \AA}$ range by four EUV telescopes in Earth orbit (Bowyer & Malina 1990). Moreover, the primary goal of the Far Ultraviolet Spectroscopy Explorer (FUSE) mission which is being developed by NASA is to obtain high resolution spectra

with unprecedented sensitivity in the wavelength range 912 - 1250 Å (Soneborn 1991). Consequently, one of the principal aims of this paper is to complement available C IV Stark broadening data with the lines of large principal quantum number.

This paper is the sixth of a series devoted to the calculation of Stark broadening parameters of spectral lines of multicharged ions. The first five were concerned with C IV, Si IV, O VI, N V Sc III and Ti IV lines (Dimitrijević *et al.* 1991a-d, Dimitrijević & Sahal-Brechot 1992a-c). By using the semiclassical-perturbation formalism (Sahal-Bréchot 1969ab), we have calculated electron-, proton-, and ionized helium-impact line widths and shifts for 69 C IV multiplets of large principal quantum number. A summary of the formalism is given in Dimitrijević & Sahal-Bréchot (1991a). Here, we present and discuss the results for C IV multiplets of large principal quantum number, along with a discussion of the Stark broadening parameter regularities within spectral series.

2. Results and discussion.

Energy levels for C IV lines have been taken from Bashkin & Stoner (1975). Oscillator strengths have been calculated by using the method of Bates & Damgaard (1949) and the tables of Oertel & Shomo (1968). For higher levels, the method described by Van Regemorter *et al.* (1979) has been used.

In addition to electron-impact full halfwidths and shifts, Stark-broadening parameters due to proton-, and

ionized helium- impacts have been calculated. At high temperatures helium is ionized twice; yet the Stark broadening parameters due to doubly charged helium have not been provided, because they are smaller than previous one: the increase of the Coulomb repulsion entails a decrease of the line width. Besides, owing to the neutrality plasma condition, the electron density is twice larger than the corresponding doubly charged helium density due to the fact that helium is twice ionized and thus the relative contribution of the electron impact broadening is more important. Consequently, the influence of other multiply charged ions on the line broadening parameters is much smaller.

Our results for C IV multiplets of large principal quantum number are shown in Table 1, for perturber densities $10^{13} - 10^{18} \text{ cm}^{-3}$ and temperatures $T = 20,000 - 200,000 \text{ K}$. In table 2 Stark broadening parameters are presented for far UV C IV multiplets for temperatures $T = 20,000 - 200,000 \text{ K}$ and only for a perturber density of 10^{15} cm^{-3} , since these lines are not so important for model atmosphere analysis in comparison with previous ones. However, data for other densities may be provided by authors upon request. We also specify a parameter c (Dimitrijević & Sahal-Bréchot 1984), which gives an estimate for the maximum perturber density for which the line may be treated as isolated when it is divided by the corresponding electron-impact full width at half maximum. For each value given in Tables 1 and 2, the collision volume (V) multiplied by the perturber density (N) is much less than one and the impact approximation is valid (Sahal-Bréchot 1969ab). Values for $NV > 0.5$ are not given and values for $0.1 < NV < 0.5$ are denoted by an asterisk. When the impact approximation is not valid, the ion broadening contribution may be estimated by using quasistatic estimations (Sahal-Bréchot 1991 and Griem 1974). The accuracy of the results obtained decreases when broadening by ion interactions becomes important.

In Figures 1-4, the electron and proton full halfwidths and shifts within the $2p^2P^o - ns^2S$ series are reported. By inspecting the energy separation between the upper level and the principal perturbing levels (see the Grotrian diagrams in Bashkin & Stoner 1975), we find that this separation decreases gradually within a spectral series. We obtain therefore, a gradual change of the Stark widths as in the case analysed in Dimitrijević et al. (1991a) when the upper level was a p level. In Figures 5 and 6 the case of C IV $np^2P^o - 9s^2S$ transitions, i.e. the case when the upper level does not change is presented. We can see that particularly for shifts the changes of Stark broadening parameters are relatively small, permitting the interpolation of new data or critical evaluation of mutual consistency of existing data.

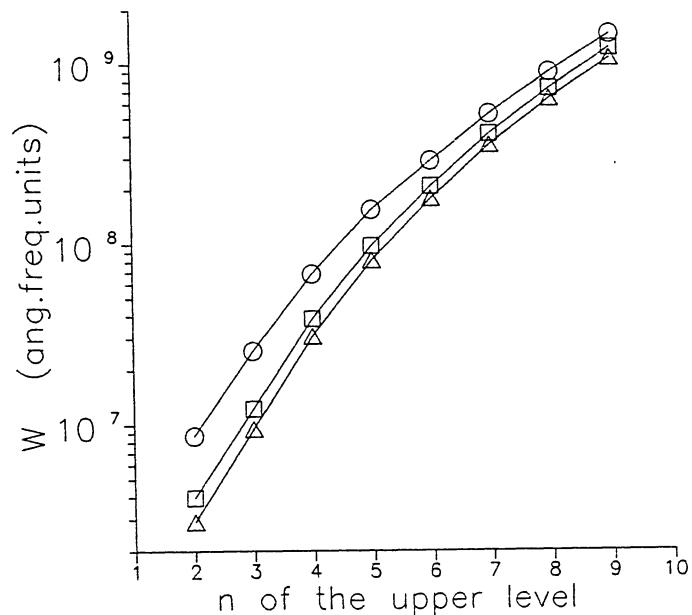


FIGURE 1. Electron-impact full half-widths (in angular frequency units) for the C IV $2p^2P^o - ns^2S$ lines as a function of n for $T = 20,000 \text{ K}$ (O); $100,000 \text{ K}$ (□) and $200,000 \text{ K}$ (Δ) at $N_e = 10^{13} \text{ cm}^{-3}$.

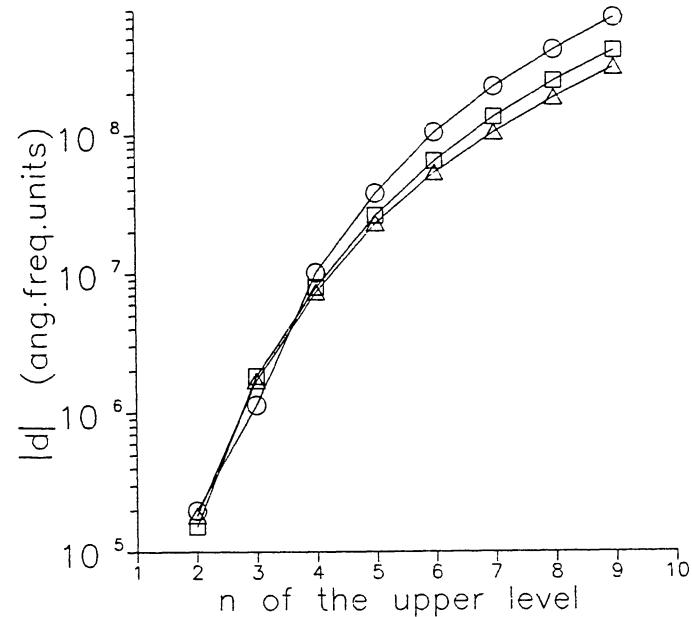


FIGURE 2. As in Fig. 1 but for the electron - impact shift.

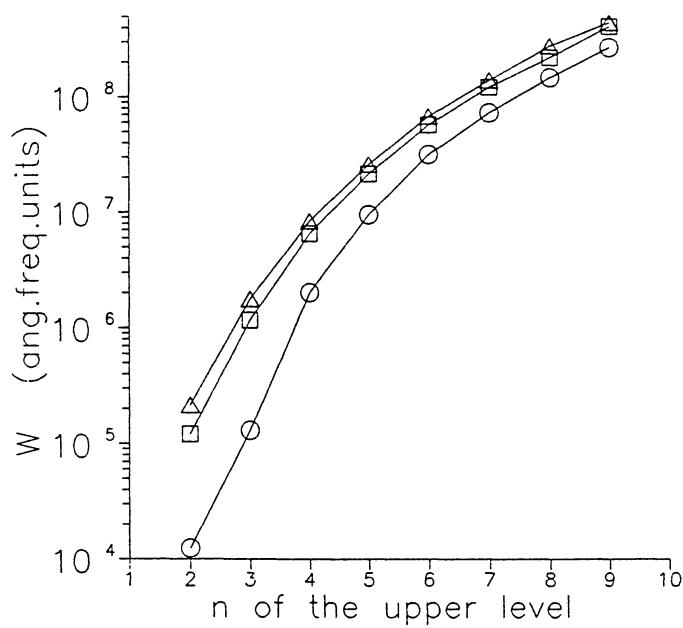


FIGURE 3. As in Fig. 1 but for the proton - impact full halfwidth.

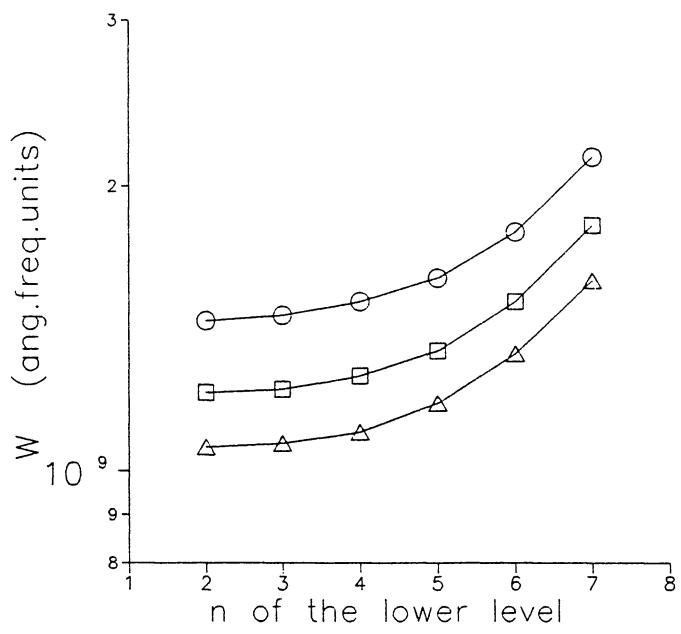


FIGURE 5. As in Fig. 1 but for the C IV $np^2P^o - 9s^2S$ electron - impact width.

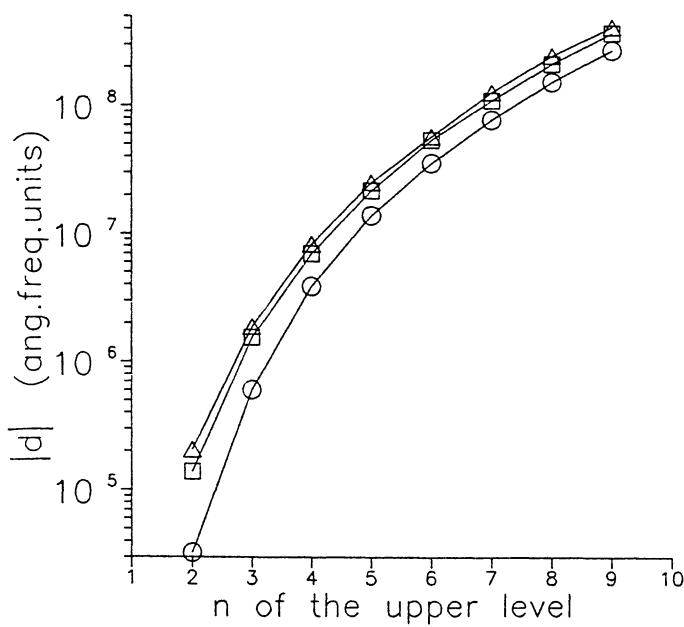


FIGURE 4. As in Fig. 1 but for the proton - impact shift.

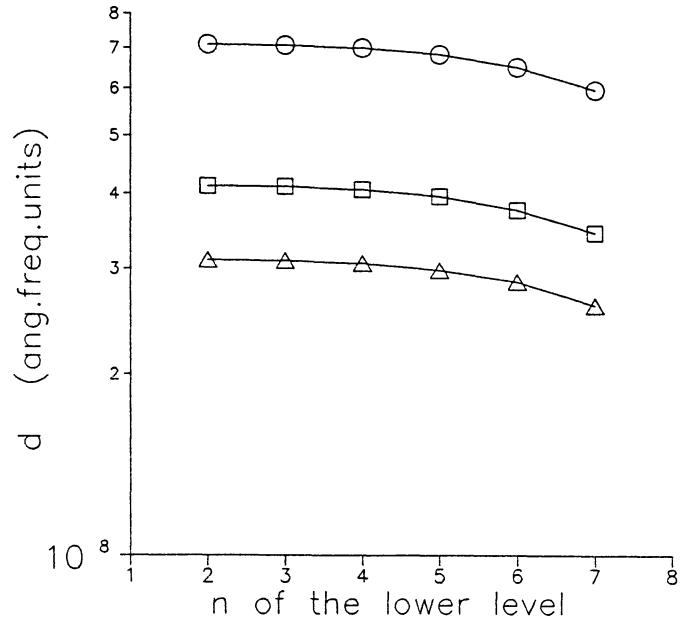


FIGURE 6. As in Fig. 1 but for the C IV $np^2P^o - 9s^2S$ electron - impact shift.

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PERTURBER DENSITY = 0.10+14(cm ⁻³)							
TRANSITION	PERTURBERS ARE	ELECTRONS		PROTONS		IONIZED HELIUM	
		T(K)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)
CIV 4D-6F	20000.	0.154E-03	0.153E-05	0.223E-03	0.209E-03	0.185E-03	0.170E-03
	1637.6 A	50000.	0.116E-03	-0.421E-06	0.256E-03	0.255E-03	0.244E-03
	C= 0.79E+12	100000.	0.922E-04	-0.154E-05	0.356E-03	0.275E-03	0.240E-03
CIV 4D-7F	20000.	0.720E-04	-0.118E-05	0.356E-03	0.324E-03	0.307E-03	0.252E-03
	1351.3 A	50000.	0.160E-03	-0.616E-06	0.386E-03	0.406E-03	0.424E-03
	C= 0.35E+12	100000.	0.126E-03	-0.238E-05	0.516E-03	0.450E-03	0.462E-03
CIV 4F-5G	20000.	0.697E-04	-0.310E-05	0.973E-04	-0.966E-04	0.832E-04	-0.795E-04
	2530.7 A	50000.	0.523E-04	-0.155E-05	0.124E-03	-0.115E-03	0.102E-03
	C= 0.55E+13	100000.	0.419E-04	-0.323E-06	0.144E-03	-0.130E-03	0.112E-03
CIV 4F-6G	20000.	0.128E-03	-0.168E-05	0.341E-03	0.315E-03	0.306E-03	0.257E-03
	1640.1 A	50000.	0.950E-04	-0.160E-05	0.436E-03	0.357E-03	0.313E-03
	C= 0.17E+12	100000.	0.744E-04	0.124E-06	0.445E-03	0.398E-03	0.414E-03
CIV 4F-7G	20000.	0.576E-04	0.189E-06	0.574E-03	0.431E-03	0.405E-03	0.397E-03
	1353.0 A	50000.	0.213E-03	-0.201E-05	0.647E-03	0.605E-03	*0.620E-03
	C= 0.81E+11	100000.	0.156E-03	-0.155E-05	0.853E-03	0.664E-03	0.635E-03
CIV 5D-6F	20000.	0.931E-04	-0.146E-06	0.956E-03	0.103E-02	0.107E-02	0.625E-03
	4647.0 A	50000.	0.111E-02	-0.158E-04	0.198E-02	0.198E-02	0.196E-02
	C= 0.64E+13	100000.	0.885E-03	-0.216E-04	0.282E-02	0.219E-02	0.196E-02
CIV 5D-7F	20000.	0.693E-03	-0.147E-04	0.286E-02	0.251E-02	0.252E-02	0.175E-02
	2902.4 A	50000.	0.807E-03	-0.739E-05	0.177E-02	0.185E-02	0.194E-02
	C= 0.16E+13	100000.	0.638E-03	-0.1142E-04	0.241E-02	0.209E-02	0.210E-02
CIV 5F-6G	20000.	0.496E-03	-0.914E-05	0.230E-02	0.241E-02	0.218E-02	0.203E-02
	4658.5 A	50000.	0.983E-03	-0.152E-04	0.358E-02	0.277E-02	0.242E-02
	C= 0.14E+13	100000.	0.774E-03	0.219E-06	0.350E-02	0.304E-02	0.290E-02
CIV 5F-7G	20000.	0.601E-03	0.274E-05	0.441E-02	0.331E-02	0.288E-02	0.312E-02
	2906.5 A	50000.	0.802E-03	-0.812E-05	0.392E-02	0.304E-02	0.290E-02
	C= 0.37E+12	100000.	0.626E-03	0.335E-06	0.538E-02	0.361E-02	0.296E-02
CIV 5G-6F	20000.	0.483E-03	-0.212E-06	0.429E-02	0.464E-02	0.497E-02	0.288E-02
	4661.0 A	50000.	0.979E-03	0.861E-05	0.242E-02	0.219E-02	0.203E-02
	C= 0.64E+13	100000.	0.775E-03	-0.692E-05	0.310E-02	0.241E-02	0.202E-02
CIV 5G-7F	20000.	0.604E-03	-0.885E-05	0.320E-02	0.281E-02	0.269E-02	0.197E-02

STARK BROADENING OF C IV LINES

TABLE 1. (continued)

PERTURBER DENSITY = 0.10+14(cm ⁻³)		PERTURBERS ARE ELECTRONS		PROTONS		IONIZED HELIUM		PERTURBER DENSITY = 0.10+15(cm ⁻³)		PROTONS	
PERTURBER	TRANSITION	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	PERTURBERS ARE ELECTRONS	TRANSITION	SHIFT(A)	WIDTH(A)
	T(K)							T(K)			
CIV 5G-7F	20000.	0.101E-02	0.245E-04	0.174E-02	0.151E-02	0.132E-02	0.646E-04	0.102E-02	0.170E-02	0.106E-02	-0.846E-03
2907.4 A	50000.	0.755E-03	0.204E-05	0.181E-02	0.198E-02	0.147E-02	0.621E-03	0.132E-02	0.122E-02	0.102E-02	-0.998E-03
C= 0.16E+13	100000.	0.596E-03	-0.853E-05	0.235E-02	0.215E-02	0.221E-02	0.190E-04	0.154E-02	0.137E-02	0.119E-02	-0.119E-02
200000.	0.464E-03	-0.688E-05	0.259E-02	0.249E-02	0.233E-02	0.205E-02	0.400E-03	0.470E-05	0.160E-02	-0.153E-02	-0.128E-02
CIV 5G-6H	20000.	0.561E-03	-0.670E-05	0.290E-02	-0.287E-02	0.246E-02	-0.228E-02	CIV 4F-5G	20000.	0.690E-03	-0.966E-03
4660.2 A	50000.	0.418E-03	0.606E-05	0.349E-02	-0.313E-02	0.295E-02	-0.296E-02	2524.6 A	50000.	0.518E-03	-0.115E-02
C= 0.14E+13	100000.	0.332E-03	0.620E-05	0.377E-02	-0.345E-02	0.358E-02	-0.323E-02	C= 0.55E+14	100000.	0.416E-03	-0.323E-05
200000.	0.262E-03	0.583E-05	0.458E-02	-0.369E-02	0.393E-02	-0.349E-02	200000.	0.400E-03	0.470E-05	0.160E-02	-0.153E-02
CIV 60-7F	20000.	0.886E-02	-0.401E-04	0.122E-01	0.103E-01	0.983E-02	0.892E-02	CIV 4F-6G	20000.	0.117E-02	-0.168E-04
7708.6 A	50000.	0.668E-02	-0.116E-03	0.125E-01	0.127E-01	0.134E-01	0.103E-01	1640.1 A	50000.	0.877E-03	-0.160E-04
C= 0.11E+14	100000.	0.530E-02	-0.138E-03	0.166E-01	0.147E-01	0.137E-01	0.122E-01	C= 0.17E+13	100000.	0.692E-03	0.124E-05
200000.	0.414E-02	-0.855E-04	0.159E-01	0.164E-01	0.148E-01	0.138E-01	200000.	0.539E-03	0.189E-05	0.574E-02	0.431E-02
CIV 6F-7D	20000.	0.762E-02	0.274E-03	0.422E-02	-0.369E-02	0.360E-02	-0.313E-02	CIV 4F-7G	20000.	0.187E-02	-0.201E-04
7746.1 A	50000.	0.588E-02	0.207E-03	0.498E-02	-0.431E-02	0.432E-02	-0.371E-02	C= 0.81E+12	50000.	0.139E-02	-0.155E-04
C= 0.18E+14	100000.	0.474E-02	0.161E-03	0.534E-02	-0.535E-02	0.519E-02	-0.384E-02	200000.	0.109E-02	0.147E-05	
200000.	0.376E-02	0.947E-04	0.655E-02	-0.584E-02	0.589E-02	-0.472E-02	C= 0.87E-01	200000.	0.956E-02	-0.146E-05	
CIV 6F-7G	20000.	0.965E-02	-0.132E-03	0.207E-01	0.178E-01	*0.183E-01	*0.154E-01	CIV 5D-6P	20000.	0.905E-02	0.257E-03
7726.7 A	50000.	0.713E-02	-0.509E-04	0.261E-01	0.201E-01	0.166E-01	0.183E-01	4786.8 A	50000.	0.734E-02	0.152E-02
C= 0.24E+13	100000.	0.557E-02	0.262E-04	0.315E-01	0.255E-01	0.211E-01	0.191E-01	C= 0.15E+16	100000.	0.620E-02	0.239E-02
200000.	0.428E-02	0.151E-04	0.296E-01	0.281E-01	0.321E-01	0.212E-01	200000.	0.513E-02	0.233E-03	0.261E-02	0.235E-02
CIV 6G-7F	20000.	0.919E-02	0.182E-03	0.713E-02	0.665E-02	0.653E-02	0.543E-02	CIV 5D-7P	20000.	0.516E-02	0.319E-03
7729.6 A	50000.	0.684E-02	0.359E-04	0.974E-02	0.767E-02	0.665E-02	0.538E-02	2935.9 A	50000.	0.434E-02	0.316E-03
C= 0.38E+13	100000.	0.537E-02	-0.660E-04	0.977E-02	0.820E-02	0.750E-02	0.781E-02	C= 0.44E+15	100000.	0.374E-02	0.470E-03
200000.	0.416E-02	-0.485E-04	0.127E-01	0.872E-02	0.757E-02	0.816E-02	200000.	0.314E-02	0.202E-03	0.542E-03	-0.416E-03
PERTURBER DENSITY = 0.10+15(cm ⁻³)								CIV 5D-6F	20000.	0.143E-01	-0.247E-03
CIV 4P-6D	20000.	0.116E-02	0.640E-04	0.537E-03	0.517E-03	0.436E-03	0.431E-03	2902.4 A	50000.	0.109E-01	-0.310E-03
1586.0 A	50000.	0.885E-03	0.386E-04	0.720E-03	0.612E-03	0.573E-03	0.516E-03	C= 0.64E+14	100000.	0.867E-02	-0.358E-03
C= 0.81E+14	100000.	0.718E-03	0.250E-04	0.780E-03	0.673E-03	0.683E-03	0.574E-03	200000.	0.680E-02	-0.147E-03	0.286E-01
200000.	0.574E-03	0.110E-04	0.903E-03	0.849E-03	0.799E-03	0.757E-03	200000.	0.520E-01	0.251E-01	0.175E-01	
CIV 4P-7D	20000.	0.144E-02	0.875E-04	0.638E-03	0.582E-03	0.516E-03	0.475E-03	CIV 5D-7F	20000.	0.124E-01	-0.696E-04
1315.9 A	50000.	0.113E-02	0.548E-04	0.793E-03	0.694E-03	0.642E-03	0.573E-03	C= 0.19E+15	100000.	0.102E-01	-0.177E-01
C= 0.55E+13	100000.	0.913E-03	0.337E-04	0.759E-03	0.762E-03	0.693E-03	0.628E-03	C= 0.64E+14	100000.	0.613E-02	-0.162E-03
200000.	0.734E-03	0.169E-04	0.999E-03	0.999E-03	0.799E-03	0.747E-03	200000.	0.480E-02	-0.914E-04	0.230E-01	-0.218E-01
CIV 4D-6F	20000.	0.149E-02	0.153E-04	0.223E-02	0.209E-02	*0.185E-02	*0.170E-02	CIV 5F-6D	20000.	0.124E-01	0.615E-03
1637.6 A	50000.	0.113E-02	-0.421E-05	0.255E-02	0.244E-02	0.190E-02	0.280E-02	2909.3 A	50000.	0.959E-02	0.404E-03
C= 0.81E+14	100000.	0.900E-03	-0.154E-04	0.356E-02	0.275E-02	0.209E-02	0.450E-02	C= 0.19E+15	100000.	0.776E-02	0.268E-03
200000.	0.705E-03	-0.118E-04	0.356E-02	0.324E-02	0.307E-02	0.232E-02	200000.	0.618E-02	0.164E-03	0.390E-02	-0.146E-02
CIV 4D-7F	20000.	0.203E-02	0.348E-04	*0.385E-02	*0.323E-02	*0.320E-02	*0.280E-02	CIV 5F-7D	20000.	0.124E-01	0.615E-03
1351.3 A	50000.	0.152E-02	-0.616E-05	*0.386E-02	*0.404E-02	*0.424E-02	*0.319E-02	C= 0.75E+14	100000.	0.798E-02	0.453E-03
C= 0.35E+13	100000.	0.121E-02	-0.258E-04	*0.516E-02	*0.450E-02	*0.462E-02	*0.389E-02	C= 0.19E+15	100000.	0.622E-02	0.273E-02
200000.	0.945E-03	-0.162E-04	0.521E-02	0.530E-02	0.453E-02	*0.442E-02	200000.	0.507E-02	0.193E-03	0.338E-02	-0.228E-02

TABLE 1. (continued)

PERTURBER DENSITY = 0.10+15(cm ⁻³)				PERTURBER DENSITY = 0.10+16(cm ⁻³)				PERTURBER DENSITY = 0.10+17(cm ⁻³)								
PERTURBERS ARE ELECTRONS		PROTONS		IONIZED HELIUM WIDTH(A)		ELECTRONS		PROTONS		IONIZED HELIUM WIDTH(A)						
TRANSITION	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)					
CIV 5F-6G	20000.	0.122E-01	-0.200E-03	*0.267E-01	*0.248E-01	*0.239E-01	*0.200E-01	CIV 4S-7P	20000.	0.702E-02	0.651E-03	0.104E-02	0.961E-03	0.902E-03	0.799E-03	
4658.5 Å	50000.	0.925E-02	-0.152E-03	0.358E-01	0.277E-01	*0.242E-01	*0.240E-01	1210.6 Å	50000.	0.599E-02	0.583E-03	0.137E-02	0.121E-02	0.118E-02	0.981E-03	
C= 0.14E+14	100000.	0.733E-02	-0.219E-05	0.350E-01	0.304E-01	*0.290E-01	*0.292E-01	C= 0.53E+16	100000.	0.524E-02	0.429E-03	0.157E-02	0.129E-02	0.140E-02	0.114E-02	
	200000.	0.572E-02	-0.274E-04	0.441E-01	0.331E-01	*0.288E-01	*0.312E-01		200000.	0.445E-02	0.331E-03	0.168E-02	0.151E-02	0.165E-02	0.125E-02	
CIV 5F-7G	20000.	0.971E-02	-0.119E-03	*0.392E-01	*0.304E-01	*0.358E-05	*0.361E-01									
2906.5 Å	50000.	0.728E-02	-0.812E-04	*0.429E-01	*0.429E-01	*0.538E-05	*0.538E-05	C= 0.37E+13	50000.	0.433E-02	0.106E-02	0.614E-03	0.531E-03	0.518E-03	0.518E-03	
	100000.	0.573E-02	-0.353E-05	*0.429E-01	*0.429E-01	*0.538E-05	*0.538E-05		100000.	0.376E-02	0.869E-03	0.738E-03	0.721E-03	0.656E-03	0.608E-03	
	200000.	0.445E-02	-0.212E-05	*0.429E-01	*0.429E-01	*0.429E-01	*0.429E-01		200000.	0.322E-02	0.721E-03	0.970E-03	0.828E-03	0.782E-03	0.704E-03	
CIV 5G-6F	20000.	0.126E-01	0.337E-03	0.196E-01	0.180E-01	*0.155E-01	*0.147E-01									
4661.0 Å	50000.	0.953E-02	0.861E-04	0.242E-01	0.219E-01	0.203E-01	0.165E-01	C= 0.22E+17	100000.	0.488E-02	0.152E-02	0.929E-03	0.774E-03	0.769E-03	0.769E-03	
C= 0.64E+14	100000.	0.756E-02	-0.692E-04	0.310E-01	0.241E-01	0.202E-01	0.163E-01		100000.	0.436E-02	0.125E-02	0.115E-02	0.104E-02	0.104E-02	0.865E-03	
	200000.	0.591E-02	-0.885E-04	0.320E-01	0.281E-01	0.269E-01	0.197E-01		200000.	0.378E-02	0.971E-03	0.131E-02	0.119E-02	0.110E-02	0.945E-03	
CIV 5G-7F	20000.	0.956E-02	0.245E-03	*0.174E-01	*0.151E-01	*0.132E-01	*0.132E-01									
2907.4 Å	50000.	0.720E-02	0.204E-04	*0.181E-01	*0.197E-01	*0.198E-01	*0.147E-01	C= 0.12E+17	100000.	0.650E-02	0.310E-02	0.112E-02	0.115E-02	0.965E-03	0.940E-03	
C= 0.16E+14	100000.	0.571E-02	-0.853E-04	*0.235E-01	*0.215E-01	*0.221E-01	*0.179E-01		100000.	0.589E-02	0.184E-02	0.168E-02	0.140E-02	0.125E-02	0.118E-02	
	200000.	0.446E-02	-0.688E-04	*0.259E-01	*0.249E-01	*0.235E-01	*0.205E-01		200000.	0.515E-02	0.139E-02	0.211E-02	0.187E-02	0.164E-02	0.139E-02	
CIV 5G-6H	20000.	0.511E-02	-0.670E-04	*0.290E-01	-0.287E-01	*0.246E-01	-0.228E-01									
4660.2 Å	50000.	0.386E-02	0.603E-04	0.349E-01	-0.313E-01	*0.283E-01	-0.296E-01	C= 0.72E+16	100000.	0.910E-02	0.347E-02	0.233E-02	0.214E-02	0.203E-02	0.170E-02	
C= 0.14E+14	100000.	0.309E-02	0.620E-04	0.377E-01	-0.365E-01	*0.338E-01	-0.323E-01		100000.	0.834E-02	0.270E-02	0.275E-02	0.244E-02	0.219E-02	0.200E-02	
	200000.	0.246E-02	0.583E-04	0.458E-01	-0.369E-01	*0.393E-01	-0.349E-01		200000.	0.733E-02	0.203E-02	0.295E-02	0.269E-02	0.289E-02	0.244E-02	
CIV 6D-7F	20000.	0.847E-01	-0.401E-03	*0.122	*0.103	*0.983E-01	*0.892E-01									
7708.6 Å	50000.	0.643E-01	-0.116E-02	*0.125	*0.127	*0.134	*0.103	C= 0.81E+15	100000.	0.82E-01	0.882E-02	0.386E-03	0.720E-02	0.616E-02	0.515E-02	
C= 0.11E+15	100000.	0.513E-01	-0.138E-02	*0.166	*0.147	*0.137	*0.122		100000.	0.716E-02	0.230E-03	0.780E-02	0.673E-02	0.683E-02	0.574E-02	
	200000.	0.402E-01	-0.855E-03	*0.159	*0.164	*0.148	*0.138		200000.	0.575E-02	0.110E-03	0.903E-02	0.849E-02	0.757E-02	0.589E-02	
CIV 6F-7D	20000.	0.751E-01	-0.274E-02	*0.422E-01	-0.369E-01	*0.360E-01	-0.313E-01									
7746.1 Å	50000.	0.561E-01	-0.207E-02	0.498E-01	-0.531E-01	*0.432E-01	-0.371E-01	C= 0.53E+15	100000.	0.78E-01	0.113E-01	0.111E-01	0.548E-03	0.793E-02	0.694E-02	0.515E-02
C= 0.18E+15	100000.	0.469E-01	-0.161E-02	0.536E-01	-0.535E-01	0.519E-01	-0.366E-01		100000.	0.910E-02	0.337E-03	0.959E-02	0.767E-02	0.683E-02	0.574E-02	
	200000.	0.372E-01	-0.947E-03	0.655E-01	-0.584E-01	0.584E-01	-0.472E-01		200000.	0.732E-02	0.169E-03	0.999E-02	0.849E-02	0.757E-02	0.589E-02	
CIV 6G-7F	20000.	0.871E-01	-0.132E-02	*0.713E-01	*0.655E-01	*0.543E-01	*0.508E-01									
7722.7 Å	50000.	0.654E-01	-0.609E-03	*0.261	*0.201	*0.166	*0.183	C= 0.26E+16	100000.	0.775E-02	0.828E-03	0.557E-02	0.429E-02	0.516E-02	0.470E-02	
C= 0.26E+14	100000.	0.515E-01	-0.262E-03	*0.315	*0.255	*0.211	*0.191		100000.	0.555E-02	0.434E-03	0.790E-03	0.650E-03	0.702E-03	0.528E-03	
	200000.	0.399E-01	-0.483E-03	*0.151E-03	*0.281	*0.281	*0.212		200000.	0.574E-02	0.466E-02	0.332E-03	0.909E-03	0.735E-03	0.603E-03	
PERTURBER DENSITY = 0.10+16(cm ⁻³)																
CIV 4S-6P	20000.	0.854E-01	0.182E-02	*0.713E-01	*0.655E-01	*0.543E-01	*0.508E-01									
1440.3 Å	50000.	0.643E-01	0.345E-03	0.974E-01	0.767E-01	0.655E-01	0.638E-01	C= 0.18E+16	100000.	0.775E-02	0.828E-03	0.557E-02	0.421E-04	0.255E-01	0.421E-03	
C= 0.12E+17	100000.	0.402E-02	0.271E-03	0.102E-02	0.873E-03	0.859E-03	0.727E-03		100000.	0.843E-02	0.154E-03	0.356E-02	0.307E-01	0.324E-01	0.232E-01	

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STARK BROADENING OF C IV LINES

TABLE 1. (continued)

PERTURBER DENSITY = 0.1D+16(cm ⁻³)		PERTURBER DENSITY = 0.1D+16(cm ⁻³)					
PERTURBERS ARE ELECTRONS		PROTONS		IONIZED HELIUM		PROTONS	
TRANSITION	T(K)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	ELECTRONS	WIDTH(A)
CIV 4D-7F	20000.	0.181E-01	-0.128E-04			C IV 5P-7S	20000.
1351.3 A	50000.	0.139E-01	-0.616E-04	2954.6 A	50000.	0.322E-01	0.929E-02
C= 0.35E+14	100000.	0.111E-01	-0.238E-03	C= 0.90E+17	100000.	0.282E-01	0.679E-02
	200000.	0.877E-02	-0.162E-03		200000.	0.252E-01	0.554E-02
						0.218E-01	0.497E-02
						0.435E-02	0.564E-02
CIV 4D-5G	20000.	0.793E-02	-0.585E-03	0.106E-01	-0.102E-01	*0.890E-02	-0.840E-02
2524.6 A	50000.	0.601E-02	-0.376E-03	0.132E-01	-0.122E-01	0.107E-01	-0.998E-02
C= 0.55E+15	100000.	0.486E-02	-0.190E-03	0.154E-01	-0.137E-01	0.119E-01	-0.119E-01
	200000.	0.390E-02	-0.470E-04	0.160E-01	-0.153E-01	0.168E-01	-0.128E-01
CIV 4F-6D	20000.	0.119E-01	0.794E-03	0.596E-02	0.560E-02	*0.492E-02	*0.468E-02
1641.0 A	50000.	0.914E-02	0.521E-03	0.805E-02	0.656E-02	*0.632E-02	*0.568E-02
C= 0.87E+15	100000.	0.742E-02	0.337E-03	0.830E-02	0.731E-02	0.745E-02	0.629E-02
	200000.	0.594E-02	0.183E-03	0.100E-01	0.928E-02	0.828E-02	0.668E-02
CIV 4F-7D	20000.	0.149E-01	0.977E-03	0.684E-02	0.616E-02	*0.557E-02	*0.505E-02
1353.6 A	50000.	0.116E-01	0.655E-03	0.849E-02	0.745E-02	*0.692E-02	*0.605E-02
C= 0.56E+15	100000.	0.947E-02	0.420E-03	0.102E-01	0.813E-02	*0.769E-02	*0.663E-02
	200000.	0.762E-02	0.225E-03	0.106E-01	0.851E-02	*0.833E-02	*0.792E-02
CIV 4F-5G	20000.	0.658E-02	-0.255E-03	0.972E-02	-0.961E-02	0.832E-02	-0.790E-02
2330.7 A	50000.	0.499E-02	-0.155E-03	0.124E-01	-0.115E-01	0.102E-01	-0.908E-02
C= 0.55E+15	100000.	0.401E-02	-0.323E-04	0.144E-01	-0.130E-01	0.112E-01	-0.106E-01
	200000.	0.322E-02	0.453E-04	0.155E-01	-0.145E-01	0.158E-01	-0.128E-01
CIV 4F-6G	20000.	0.989E-02	-0.166E-03			CIV 5D-6P	20000.
1640.1 A	50000.	0.764E-02	-0.160E-03			4788.8 A	50000.
C= 0.17E+14	100000.	0.612E-02	-0.124E-04			C= 0.12E+17	100000.
	200000.	0.483E-02	0.169E-04	*0.574E-01	*0.431E-01		
CIV 4F-7G	20000.	0.153E-01	-0.240E-03			CIV 5D-7P	20000.
1353.0 A	50000.	0.118E-01	-0.155E-03			2955.9 A	50000.
C= 0.81E+13	100000.	0.943E-02	-0.167E-04			C= 0.64E+16	100000.
	200000.	0.742E-02	-0.146E-04				200000.
CIV 5S-6P	20000.	0.484E-01	0.139E-02	0.439E-02	0.414E-02	0.400E-02	0.345E-02
3935.8 A	50000.	0.400E-01	0.106E-02	0.585E-02	0.521E-02	0.526E-02	0.439E-02
C= 0.92E+17	100000.	0.345E-01	0.637E-03	0.705E-02	0.615E-02	0.606E-02	0.509E-02
	200000.	0.292E-01	0.159E-03	0.822E-02	0.716E-02	0.676E-02	0.563E-02
CIV 5P-6S	20000.	0.348E-01	0.241E-02	0.469E-02	0.432E-02	0.415E-02	0.358E-02
2592.0 A	50000.	0.297E-01	0.206E-02	0.618E-02	0.521E-02	0.526E-02	0.439E-02
C= 0.24E+17	100000.	0.260E-01	0.139E-02	0.725E-02	0.576E-02	0.622E-02	0.509E-02
	200000.	0.221E-01	0.983E-03	0.769E-02	0.683E-02	0.775E-02	0.569E-02
CIV 5P-7P	20000.	0.138E-01	0.285E-02	0.296E-02	0.272E-02	0.247E-02	0.221E-02
3935.8 A	50000.	0.106E-01	0.816E-02	0.405E-02	0.375E-02	0.344E-02	0.315E-02
C= 0.26E+18	100000.	0.468E-01	0.653E-02	0.508E-02	0.452E-02	0.423E-02	0.354E-02
	200000.	0.401E-01	0.567E-02	0.597E-02	0.506E-02	0.543E-02	0.425E-02
							0.175E-01
							0.205E-01
							0.225E-01
							0.255E-01
							0.295E-01
							0.325E-01
							0.355E-01
							0.385E-01
							0.414E-01
							0.444E-01
							0.474E-01
							0.503E-01
							0.532E-01
							0.560E-01
							0.588E-01
							0.616E-01
							0.644E-01
							0.672E-01
							0.700E-01
							0.727E-01
							0.754E-01
							0.782E-01
							0.810E-01
							0.838E-01
							0.866E-01
							0.894E-01
							0.922E-01
							0.950E-01
							0.978E-01
							0.100E-01
							0.128E-01
							0.156E-01
							0.184E-01
							0.212E-01
							0.240E-01
							0.268E-01
							0.296E-01
							0.324E-01
							0.352E-01
							0.380E-01
							0.408E-01
							0.436E-01
							0.464E-01
							0.492E-01
							0.520E-01
							0.548E-01
							0.576E-01
							0.604E-01
							0.632E-01
							0.660E-01
							0.688E-01
							0.716E-01
							0.744E-01
							0.772E-01
							0.800E-01
							0.828E-01
							0.856E-01
							0.884E-01
							0.912E-01
							0.940E-01
							0.968E-01
							0.996E-01
							0.102E-01
							0.130E-01
							0.158E-01
							0.186E-01
							0.214E-01
							0.242E-01
							0.270E-01
							0.300E-01
							0.328E-01
							0.356E-01
							0.384E-01
							0.412E-01
							0.440E-01
							0.468E-01
							0.496E-01
							0.524E-01
							0.552E-01
							0.580E-01
							0.608E-01
							0.636E-01
							0.664E-01
							0.692E-01
							0.720E-01
							0.748E-01
							0.776E-01
							0.804E-01
							0.832E-01
							0.860E-01
							0.888E-01
							0.916E-01
							0.944E-01
							0.972E-01
							0.100E-01
							0.128E-01
							0.156E-01
							0.184E-01
							0.212E-01
							0.240E-01
							0.268E-01
							0.296E-01
							0.324E-01
							0.352E-01
							0.380E-01
							0.408E-01
							0.436E-01
							0.464E-01
							0.492E-01
							0.520E-01
							0.548E-01
							0.576E-01
							0.604E-01
							0.632E-01
							0.660E-01
							0.688E-01
							0.716E-01
							0.744E-01
							0.772E-01
							0.800E-01
							0.828E-01
							0.856E-01
							0.884E-01
							0.912E-01
							0.940E-01
							0.968E-01
							0.996E-01
							0.102E-01
							0.130E-01
							0.158E-01
							0.186E-01
							0.214E-01
							0.242E-01
							0.270E-01
							0.298E-01
							0.326E-01
							0.354E-01
							0.382E-01
							0.410E-01
							0.438

TABLE 1. (continued)

PERTURBER DENSITY = 0.10 ¹⁶ (cm ⁻³)		PERTURBER DENSITY = 0.10 ¹⁶ (cm ⁻³)						PERTURBER DENSITY = 0.10 ¹⁷ (cm ⁻³)	
PERTURBERS ARE	ELECTRONS	PROTONS	IONIZED HELIUM	TRANSITION	PERTURBERS ARE	ELECTRONS	PROTONS	IONIZED HELIUM	
TRANSITION	T(K)	WIDTH(A)	SHIFT(A)	WIDTH(A)	TRANSITION	WIDTH(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)
C IV 5F-7D	20000.	0.789E-01	0.438E-02	*0.235E-01	*0.176E-01	0.190E-01	*0.176E-01	*0.194E-01	*0.179
2909.3 Å	50000.	0.616E-01	0.296E-02	0.275E-01	0.256E-01	*0.244E-01	*0.205E-01	*0.245E-02	*0.216
C= 0.73E+15	100000.	0.503E-01	0.193E-02	0.338E-01	0.303E-01	*0.283E-01	*0.228E-01	*0.254E-02	*0.238
200000.	0.403E-01	0.110E-02	0.430E-01	0.331E-01	0.275E-01	0.255E-01	0.201E-01	*0.658E-03	*0.246
C IV 5F-6G	20000.	0.106	-0.177E-02						
4658.5 Å	50000.	0.825E-01	-0.152E-02						
C= 0.14E+15	100000.	0.662E-01	0.219E-04						
200000.	0.522E-01	0.274E-03	*0.441	*0.331					
C IV 5F-7G	20000.	0.810E-01	-0.130E-02						
2906.5 Å	50000.	0.626E-01	-0.812E-03						
C= 0.37E+14	100000.	0.501E-01	0.335E-04						
200000.	0.394E-01	-0.212E-04							
C IV 5G-6F	20000.	0.114	0.157E-02						
4661.0 Å	50000.	0.881E-01	0.861E-03	*0.242	*0.219				
C= 0.64E+15	100000.	0.706E-01	-0.692E-03	*0.310	*0.241				
200000.	0.556E-01	-0.885E-03	*0.320	*0.281	*0.259	*0.197			
C IV 5G-7F	20000.	0.850E-01	0.691E-03						
2907.4 Å	50000.	0.653E-01	0.204E-03						
C= 0.16E+15	100000.	0.524E-01	-0.853E-03						
200000.	0.413E-01	-0.688E-03							
C IV 5G-6H	20000.	0.444E-01	0.268E-03						
4660.2 Å	50000.	0.344E-01	0.606E-03						
C= 0.14E+15	100000.	0.280E-01	0.620E-03						
200000.	0.225E-01	0.583E-03	*0.458	*-0.369					
C IV 6S-7P	20000.	0.251	0.208E-02	0.275E-01	0.252E-01	0.247E-01	0.221E-01	C IV 7P-8S	20000.
6393.7 Å	50000.	0.218	0.308E-02	0.352E-01	0.311E-01	0.307E-01	0.264E-01	12985.7 Å	50000.
C= 0.16E+18	100000.	0.193	0.690E-03	0.446E-01	0.366E-01	0.353E-01	0.307E-01	C= 0.61E+18	100000.
200000.	0.165	-0.576E-03	0.480E-01	0.401E-01	0.426E-01	0.343E-01	0.272E-01	200000.	0.360
C IV 6P-7S	20000.	0.340	0.638E-01	0.160E-01	0.163E-01	0.153E-01	0.121E-01	C IV 7P-9S	20000.
8385.0 Å	50000.	0.299	0.654E-01	0.213E-01	0.183E-01	0.198E-01	0.152E-01	7253.5 Å	50000.
C= 0.42E+18	100000.	0.268	0.371E-01	0.267E-01	0.214E-01	0.228E-01	0.176E-01	C= 0.19E+18	100000.
200000.	0.232	0.298E-01	0.281E-01	0.255E-01	0.272E-01	0.201E-01	0.201E-01	200000.	0.444
C IV 6P-8S	20000.	0.153	0.438E-01	0.154E-01	0.151E-01	0.129E-01	0.121E-01	C IV 7P-9S	20000.
4791.4 Å	50000.	0.138	0.318E-01	0.207E-01	0.190E-01	0.175E-01	0.154E-01	1440.3 Å	50000.
C= 0.14E+18	100000.	0.126	0.257E-01	0.239E-01	0.203E-01	0.211E-01	0.179E-01	C= 0.12E+18	100000.
200000.	0.110	0.196E-01	0.257E-01	0.238E-01	0.249E-01	0.196E-01	0.201E-01	200000.	0.339E-01
C IV 6P-9S	20000.	0.131	0.474E-01	0.187E-01	0.183E-01	0.162E-01	0.154E-01	C IV 8S-7P	20000.
3709.7 Å	50000.	0.120	0.354E-01	0.244E-01	0.219E-01	0.217E-01	0.184E-01	1210.6 Å	50000.
C= 0.80E+17	100000.	0.111	0.274E-01	0.280E-01	0.253E-01	0.234E-01	0.205E-01	C= 0.53E+17	100000.
200000.	0.97E-01	0.208E-01	0.314E-01	0.278E-01	0.269E-01	0.255E-01	0.204E-01	200000.	0.445E-01

TABLE 1. (continued)

PERTURBER DENSITY = 0.10 ⁺¹⁷ (cm ⁻³)				PERTURBER DENSITY = 0.10 ⁺¹⁷ (cm ⁻³)				PERTURBER DENSITY = 0.10 ⁺¹⁷ (cm ⁻³)							
PERTURBERS ARE ELECTRONS		PROTONS		IONIZED HELIUM		ELECTRONS		PROTONS		IONIZED HELIUM					
TRANSITION	1(K)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	TRANSITION	1(K)	SHIFT(A)	WIDTH(A)				
C IV 4P-6S	20000.	0.519E-01	0.140E-01	0.434E-02	0.470E-02	0.383E-02	0.397E-02	C IV 4F-5G	20000.	0.583E-01	0.244E-03	*0.963E-01	-0.898E-01		
1653.9 A	50000.	-0.333E-01	0.104E-01	0.614E-02	0.612E-02	0.532E-02	0.516E-02	2530.7 A	50000.	-0.451E-01	-0.734E-03	*0.124	*-0.114		
C= 0.55E+16	100000.	0.376E-01	0.869E-02	0.738E-02	0.721E-02	0.656E-02	0.608E-02	C= 0.55E+16	100000.	0.368E-01	-0.323E-03	*0.144	*-0.130		
	200000.	0.322E-01	0.721E-02	0.970E-02	0.828E-02	0.782E-02	0.704E-02		200000.	0.299E-01	-0.453E-03	*0.155	*-0.145		
C IV 4P-7S	20000.	0.565E-01	0.204E-01	0.690E-02	0.703E-02	*0.586E-02	*0.586E-02	C IV 5S-6P	20000.	0.484	0.126E-01	0.439E-01	0.401E-01	0.400E-01	
1344.3 A	50000.	0.488E-01	0.151E-01	0.957E-02	0.925E-02	0.775E-02	0.764E-02	3935.6 A	50000.	0.400	0.103E-01	0.585E-01	0.519E-01	0.526E-01	
C= 0.22E+16	100000.	0.436E-01	0.125E-01	0.115E-01	0.104E-01	0.104E-01	0.865E-02	C= 0.92E+18	100000.	0.345	0.637E-02	0.705E-01	0.615E-01	0.606E-01	
	200000.	0.378E-01	0.971E-02	0.151E-01	0.119E-01	0.119E-01	0.946E-02		200000.	0.292	0.159E-02	0.822E-01	0.716E-01	0.676E-01	
C IV 4P-8S	20000.	0.730E-01	0.301E-01	*0.112E-01	*0.110E-01	*0.972E-02	*0.894E-02	C IV 5S-7P	20000.	0.348	0.222E-01	*0.469E-01	*0.414E-01	*0.413E-01	
1200.0 A	50000.	0.650E-01	0.227E-01	*0.148E-01	*0.139E-01	*0.125E-01	*0.117E-01	2591.9 A	50000.	0.297	0.202E-01	*0.617E-01	*0.540E-01	*0.535E-01	
C= 0.12E+18	100000.	0.569E-01	0.184E-01	0.168E-01	0.161E-01	0.150E-01	0.126E-01	C= 0.24E+18	100000.	0.260	0.139E-01	0.725E-01	0.576E-01	0.622E-01	
	200000.	0.515E-01	0.139E-01	0.139E-01	0.211E-01	0.187E-01	*0.164E-01	*0.159E-01		200000.	0.221	0.983E-02	0.769E-01	0.683E-01	0.735E-01
C IV 4P-9S	20000.	0.100	0.445E-01	*0.181E-01	*0.167E-01	*0.212E-01	*0.244E-01	C IV 5P-6S	20000.	0.634	0.108	0.288E-01	0.290E-01	0.272E-01	
1118.4 A	50000.	0.911E-01	0.345E-01	*0.254E-01	*0.275E-01	*0.244E-01	*0.219E-01	5022.2 A	50000.	0.536	0.815E-01	0.404E-01	0.374E-01	0.364E-01	
C= 0.72E+17	100000.	0.834E-01	0.268E-01	*0.275E-01	*0.275E-01	*0.244E-01	*0.289E-01	C= 0.26E+19	100000.	0.458	0.653E-01	0.508E-01	0.452E-01	0.425E-01	
	200000.	0.733E-01	0.203E-01	*0.294E-01	*0.294E-01	*0.269E-01	*0.289E-01		200000.	0.401	0.567E-01	0.597E-01	0.566E-01	0.543E-01	
C IV 4P-6D	20000.	0.109	0.229E-02	0.316E-02	0.345E-01	*0.230E-02	*0.278E-01	C IV 5P-7S	20000.	0.322	0.918E-01	0.305E-01	0.306E-01	0.265E-01	
1586.0 A	50000.	0.845E-01	0.689E-01	0.689E-01	0.689E-01	0.689E-01	0.689E-01	2954.6 A	50000.	0.282	0.677E-01	0.405E-01	0.392E-01	0.329E-01	
C= 0.81E+16	100000.	0.555E-01	0.110E-02	*0.903E-01	*0.903E-01	*0.849E-01	*0.849E-01	C= 0.90E+18	100000.	0.252	0.553E-01	0.497E-01	0.464E-01	0.374E-01	
	200000.	0.555E-01	0.203E-01	*0.294E-01	*0.294E-01	*0.269E-01	*0.289E-01		200000.	0.218	0.435E-01	0.564E-01	0.499E-01	0.431E-01	
C IV 4D-6P	20000.	0.784E-01	0.527E-02	0.510E-02	0.419E-02	0.496E-02	0.350E-02	C IV 5P-8S	20000.	0.305	0.110	*0.407E-01	*0.397E-01	*0.362E-01	
1654.5 A	50000.	0.647E-01	0.516E-02	0.665E-02	0.545E-02	0.621E-02	0.451E-02	2337.0 A	50000.	0.274	0.824E-01	*0.540E-01	*0.505E-01	*0.455E-01	
C= 0.26E+17	100000.	0.555E-01	0.332E-01	0.434E-02	0.390E-02	0.630E-02	0.702E-02	C= 0.45E+18	100000.	0.249	0.667E-01	0.622E-01	0.578E-01	0.560E-01	
	200000.	0.466E-01	0.573E-01	0.466E-02	0.909E-02	0.735E-02	0.760E-02	0.603E-02		200000.	0.218	0.507E-01	0.763E-01	0.688E-01	0.518E-01
C IV 4D-7P	20000.	0.908E-01	0.793E-02	*0.114E-01	*0.101E-01	*0.102E-01	*0.854E-02	C IV 5P-9S	20000.	0.356	0.145	*0.604E-01	*0.550E-01	*0.362E-01	
1358.5 A	50000.	0.775E-01	0.769E-02	0.148E-01	0.128E-01	*0.126E-01	*0.108E-01	2046.0 A	50000.	0.325	0.113	*0.772E-01	*0.695E-01	*0.421E-01	
C= 0.18E+17	100000.	0.676E-01	0.589E-02	0.179E-01	0.153E-01	*0.144E-01	*0.128E-01	C= 0.24E+18	100000.	0.298	0.874E-01	*0.913E-01	*0.808E-01	*0.448E-01	
	200000.	0.573E-01	0.469E-02	0.290E-01	0.166E-01	*0.176E-01	*0.143E-01		200000.	0.262	0.663E-01	*0.992E-01	*0.878E-01	*0.927E-01	
C IV 4D-5G	20000.	0.717E-01	-0.240E-02	*0.132	*-0.121	*-0.119	*-0.119	C IV 5P-6D	20000.	0.961	0.541E-02				
2526.6 A	50000.	0.554E-01	-0.283E-02	*-0.154	*-0.137	*-0.166	*-0.128	4442.4 A	50000.	0.754	0.139E-01				
C= 0.55E+16	100000.	0.452E-01	-0.190E-02	*-0.154	*-0.137	*-0.166	*-0.128	C= 0.64E+17	100000.	0.621	0.759E-02	*0.603	*0.525		
	200000.	0.374E-01	-0.470E-03	*-0.160	*-0.153	*-0.166	*-0.128		200000.	0.502	0.663E-01	*0.992E-01	*0.691	*0.659	
C IV 4F-6D	20000.	0.112	0.374E-02	0.446E-02	0.402E-02	0.446E-02	0.446E-02	C IV 5P-7D	20000.	0.659	0.840E-02				
1641.0 A	50000.	0.874E-01	0.545E-01	0.545E-02	0.545E-02	0.545E-02	0.545E-02	4786.8 A	50000.	0.727	0.323E-01	*0.203	*-0.186	*-0.151	
C= 0.87E+16	100000.	0.714E-01	0.337E-02	*-0.830E-01	*-0.731E-01	*-0.928E-01	*-0.100	C= 0.12E+18	100000.	0.616	0.277E-01	0.239	-0.201	*-0.205	
	200000.	0.367E-01	-0.470E-03	*-0.160	*-0.153	*-0.166	*-0.128		200000.	0.510	0.233E-01	0.261	-0.235	*-0.247	
C IV 4F-7D	20000.	0.139	0.402E-02	0.446E-02	0.446E-02	0.446E-02	0.446E-02	C IV 5P-8D	20000.	0.894	0.336E-01	*0.152	*-0.143	*-0.118	
1353.6 A	50000.	0.110	0.545E-02	0.545E-02	0.545E-02	0.545E-02	0.545E-02	4786.8 A	50000.	0.727	0.139E-01	*0.203	*-0.186	*-0.151	
C= 0.56E+16	100000.	0.905E-01	0.420E-02	0.420E-02	0.420E-02	0.420E-02	0.420E-02	C= 0.12E+18	100000.	0.616	0.277E-01	0.239	-0.201	*-0.205	
	200000.	0.732E-01	0.222E-02	0.222E-02	0.222E-02	0.222E-02	0.222E-02		200000.	0.510	0.233E-01	0.261	-0.235	*-0.247	

TABLE 1. (continued)

PERTURBER DENSITY = 0.1D+17(cm ⁻³)				PERTURBER DENSITY = 0.1D+17(cm ⁻³)				PERTURBER DENSITY = 0.1D+17(cm ⁻³)			
PERTURBERS ARE ELECTRONS		PROTONS		IONIZED HELIUM		ELECTRONS		PROTONS		IONIZED HELIUM	
TRANSITION	T(K)	WIDTH(A)	SHIFT(A)	SHIFT(A)	WIDTH(A)	TRANSITION	T(K)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)
CIV 5D-7P	20000.	0.512	0.330E-01	0.310E-01	-0.239E-01	*0.298E-01	-0.199E-01	CIV 60-7F	20000.	6.61	-0.152
2935.9 Å	50000.	0.431	0.318E-01	0.359E-01	-0.508E-01	*0.368E-01	-0.255E-01	7708.6 Å	50000.	5.26	-0.174
C= 0.44E+17	100000.	0.372	0.242E-01	0.470E-01	-0.358E-01	*0.403E-01	-0.294E-01	C= 0.11E+17	100000.	4.30	-0.138
	200000.	0.313	0.202E-01	0.542E-01	-0.416E-01	*0.449E-01	-0.355E-01		200000.	3.43	-0.855E-01
CIV 5D-6F	20000.	1.16	-0.269E-01					CIV 6F-7D	20000.	6.46	0.155
4647.0 Å	50000.	0.916	-0.256E-01					7746.1 Å	50000.	5.14	0.203
C= 0.64E+16	100000.	0.746	-0.216E-01					C= 0.18E+17	100000.	4.22	0.161
	200000.	0.594	-0.147E-01						200000.	3.39	0.947E-01
CIV 5F-6D	20000.	1.13	0.343E-01	0.206	0.193	0.160	0.203	C IV 7P-8S	20000.	2.72	0.651
4645.0 Å	50000.	0.890	0.370E-01	0.278	0.252	0.225	0.235	12985.7 Å	50000.	1.92	0.833
C= 0.19E+17	100000.	0.728	0.268E-01	0.331	0.293	0.265	0.235	C= 0.61E+19	100000.	1.60	0.960
	200000.	0.584	0.164E-01	0.390	0.328	0.282	0.258		200000.	1.21	0.837
CIV 5F-7D	20000.	0.730	0.201E-01					C IV 7P-9S	20000.	5.99	1.60
2909.3 Å	50000.	0.579	0.257E-01					7253.4 Å	50000.	5.53	1.22
C= 0.73E+16	100000.	0.477	0.195E-01					C= 0.19E+19	100000.	5.07	0.955
	200000.	0.385	0.110E-01						200000.	4.44	0.724
CIV 6S-7P	20000.	2.51	0.992E-02	*0.275	*0.241	*0.248	*0.201	CIV 4S-6P	20000.	0.567	18.(cm ⁻³)
6593.7 Å	50000.	2.18	0.288E-01	0.351	0.309	*0.307	*0.262	1440.3 Å	50000.	0.467	0.260E-01
C= 0.16E+19	100000.	1.93	0.699E-02	0.446	0.366	*0.353	*0.307	C= 0.12E+19	100000.	0.401	0.264E-01
	200000.	1.65	-0.576E-02	0.480	0.401	*0.426	*0.343		200000.	0.339	0.190E-01
C IV 6P-7S	20000.	3.40	0.635	0.160	0.139	0.153	0.117	CIV 4S-7P	20000.	0.698	0.342E-01
8385.0 Å	50000.	2.99	0.453	0.213	0.183	0.198	0.153	1210.6 Å	50000.	0.596	0.487E-01
C= 0.42E+19	100000.	2.68	0.371	0.267	0.214	0.228	0.176	C= 0.53E+18	100000.	0.522	0.414E-01
	200000.	2.32	0.298	0.281	0.235	0.272	0.201		200000.	0.444	0.331E-01
C IV 6P-8S	20000.	1.53	0.427	*0.154	*0.144	*0.130	*0.120	C IV 4P-6S	20000.	0.519	0.133
4791.4 Å	50000.	1.38	0.316	*0.207	*0.188	*0.175	*0.153	1653.9 Å	50000.	0.433	0.104
C= 0.14E+19	100000.	1.26	0.257	0.239	0.203	*0.211	*0.179	C= 0.55E+19	100000.	0.376	0.864E-01
	200000.	1.10	0.196	0.257	0.238	*0.249	*0.196		200000.	0.322	0.717E-01
C IV 6P-7S	20000.	1.30	0.455	*0.186	*0.173			C IV 4P-7S	20000.	0.565	0.190
3709.7 Å	50000.	1.20	0.352	*0.244	*0.217			1344.3 Å	50000.	0.488	0.147
C= 0.80E+18	100000.	1.11	0.273	*0.280	*0.253	*0.234	*0.203	C= 0.22E+19	100000.	0.436	0.124
	200000.	0.971	0.208	*0.314	*0.278	*0.269	*0.255		200000.	0.378	0.964E-01
CIV 6D-7P	20000.	5.07	-0.100E-01					C IV 4P-8S	20000.	0.730	0.274
7389.4 Å	50000.	4.16	0.424E-01					1118.4 Å	50000.	0.650	0.216
C= 0.20E+18	100000.	3.54	0.254E-01					C= 0.72E+18	100000.	0.589	0.182
	200000.	2.94	-0.658E-02						200000.	0.515	0.138
CIV 6D-7P	20000.	5.02	0.210					C IV 4P-9S	20000.	0.998	0.388

TABLE 1. (continued)

PERTURBER DENSITY = 0.1D+18(cm ⁻³)		PERTURBERS ARE ELECTRONS		PROTONS		IONIZED HELIUM		PERTURBER DENSITY = 0.1D+18(cm ⁻³)		IONIZED HELIUM	
PERTURBERS	TRANSITION	T(K)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	TRANSITION	T(K)	WIDTH(A)	SHIFT(A)
CIV 5S-6P	20000.	4.84	0.538E-01	*0.437	*0.334	*0.496	*0.488	CIV 5G-6F	20000.	7.05	0.172E-02
3935.6 Å	50000.	4.00	0.771E-01	*0.581	*0.407	*0.610	*0.606	4661.0 Å	50000.	6.03	-0.106
C= 0.92E+19	100000.	3.45	0.585E-01	*0.705	*0.361	*0.449	*0.449	C= 0.64E+17	100000.	5.09	-0.132
	200000.	2.92	0.159E-01	*0.822	*0.716	*0.563	*0.563		200000.	4.16	-0.885E-01
CIV 5S-7P	20000.	3.46	0.104					C IV 5P-9S	20000.	13.0	3.99
2591.9 Å	50000.	2.96	0.163					3709.7 Å	50000.	12.0	3.29
C= 0.24E+19	100000.	2.59	0.132					C= 0.80E+19	100000.	11.0	2.70
	200000.	2.21	0.983E-01						200000.	9.70	2.05
CIV 5P-6S	20000.	6.33	1.05	0.286	0.255	*0.268	*0.206	PERTURBER DENSITY = 0.1D+19(cm ⁻³)			
5032.2 Å	50000.	5.36	0.805	0.407	0.361	*0.361	*0.300	CIV 4S-6P	20000.	5.43	-0.573E-01
C= 0.25E+20	100000.	4.68	0.650	0.508	0.449	*0.423	*0.367	1440.3 Å	50000.	4.53	0.109
	200000.	4.01	0.565	0.597	0.506	*0.543	*0.425	C= 0.12E+20	100000.	3.92	0.170
C IV 5P-7S	20000.	3.22	0.857					CIV 4S-7P	20000.	6.15	-0.209
2934.6 Å	50000.	2.82	0.657	*0.403	*0.368	*0.460	*0.304	1210.6 Å	50000.	5.48	0.109
C= 0.90E+19	100000.	2.52	0.550	*0.497	*0.499	*0.564	*0.431	C= 0.53E+19	100000.	4.89	0.209
	200000.	2.18	0.432	*0.564	*0.499	*0.504	*0.431		200000.	4.21	0.290
C IV 5P-8S	20000.	3.05	0.998					C IV 4P-6S	20000.	5.18	1.12
2337.0 Å	50000.	2.74	0.785					1653.9 Å	50000.	4.32	0.913
C= 0.45E+19	100000.	2.49	0.661					C= 0.55E+20	100000.	3.76	0.807
	200000.	2.18	0.502						200000.	3.21	0.711
C IV 5P-9S	20000.	3.55	1.26					C IV 4P-7S	20000.	5.59	1.43
2046.0 Å	50000.	3.25	1.05					1344.3 Å	50000.	4.85	1.19
C= 0.24E+19	100000.	2.98	0.865					C= 0.22E+20	100000.	4.33	1.12
	200000.	2.62	0.653						200000.	3.76	0.948
C IV 5P-6D	20000.	8.34	-0.402					C IV 4P-8S	20000.	*6.95	*1.77
4442.4 Å	50000.	6.75	-0.161					1200.0 Å	50000.	6.30	1.60
C= 0.64E+18	100000.	5.65	-0.179E-01					C= 0.12E+20	100000.	5.75	1.56
	200000.	4.63	0.122E-01						200000.	5.05	1.34
CIV 5D-6P	20000.	8.47	0.460					C IV 4P-9S	20000.	*8.73	*2.03
4786.8 Å	50000.	6.98	0.413					1118.4 Å	50000.	8.39	2.10
C= 0.12E+19	100000.	5.95	0.304					C= 0.72E+19	100000.	7.85	2.11
	200000.	4.96	0.233						200000.	6.98	1.93
CIV 5D-7P	20000.	4.92	0.266					CIV 4D-6P	20000.	7.22	0.516E-01
2935.9 Å	50000.	4.19	0.316	*0.396	*-0.294	*-0.355	*-0.335	1654.5 Å	50000.	6.10	0.274
C= 0.44E+18	100000.	3.64	0.247	*0.469	*-0.469	*-0.416	*-0.449	C= 0.26E+19	100000.	5.29	0.338
	200000.	3.06	0.202	*0.562	*-0.416	*-0.449	*-0.335		200000.	4.48	0.320
CIV 5D-6F	20000.	8.90	0.129					CIV 4D-7P	20000.	7.78	
4647.0 Å	50000.	7.47	-0.122					1358.5 Å	50000.	6.99	0.224
C= 0.64E+17	100000.	6.27	-0.218					C= 0.18E+19	100000.	6.23	0.337
	200000.	5.10	-0.147						200000.	5.36	0.425

TABLE 2. This table shows electron-, proton-, and ionized-helium-impact broadening parameters for far UV C IV lines of large principal quantum number of the upper level, for a perturber density of 10^{15} cm^{-3} and temperatures from 20,000 to 200,000 K. The other notation is the same as in Table 1. Data for other densities may be provided by author upon request.

PERTURBER DENSITY = 0.10 ¹⁶ (cm ⁻³)		PERTURBER DENSITY = 0.10 ¹⁶ (cm ⁻³)				PERTURBER DENSITY = 0.10 ¹⁶ (cm ⁻³)							
PERTURBERS ARE ELECTRONS	PROTONS	IONIZED HELIUM	IONIZED HELIUM	PERTURBERS ARE ELECTRONS	PROTONS	IONIZED HELIUM	IONIZED HELIUM						
TRANSITION T(K)	WIDTH(A)	SHIFT(A)	WIDTH(A)	TRANSITION T(K)	WIDTH(A)	SHIFT(A)	WIDTH(A)						
CIV 2S-6P 212.4 Å C= 0.27E+15	20000. 0.111E-03 50000. 0.923E-04 100000. 0.795E-04 200000. 0.672E-04	0.998E-05 0.935E-05 0.745E-05 0.581E-05	0.140E-04 0.186E-04 0.227E-04 0.270E-04	0.133E-04 0.170E-04 0.193E-04 0.224E-04	0.128E-04 0.166E-04 0.189E-04 0.218E-04	0.112E-04 0.140E-04 0.160E-04 0.184E-04	0.750E-04 0.611E-03 0.530E-03 0.453E-03	0.247E-03 0.187E-03 0.154E-03 0.127E-03	0.750E-04 0.109E-03 0.137E-03 0.167E-03	0.849E-04 0.108E-03 0.129E-03 0.153E-03	0.665E-04 0.912E-04 0.903E-04 0.121E-03	0.718E-04 0.912E-04 0.903E-04 0.121E-03	
CIV 2S-7P 206.6 Å C= 0.15E+15	20000. 0.193E-03 50000. 0.166E-03 100000. 0.145E-03 200000. 0.124E-03	0.205E-04 0.187E-04 0.141E-04 0.112E-04	0.304E-04 0.403E-04 0.453E-04 0.494E-04	0.282E-04 0.354E-04 0.378E-04 0.445E-04	0.264E-04 0.344E-04 0.408E-04 0.479E-04	0.235E-04 0.344E-04 0.408E-04 0.445E-04	0.200000. 0.500000. 0.100000. 0.200000.	0.108E-02 0.939E-03 0.837E-03 0.210E-03	0.147E-03 0.198E-03 0.245E-03 0.282E-03	0.147E-03 0.198E-03 0.245E-03 0.282E-03	0.155E-03 0.206E-03 0.245E-03 0.282E-03	0.132E-03 0.165E-03 0.179E-03 0.203E-03	0.132E-03 0.165E-03 0.179E-03 0.203E-03
C IV 2P-6S 27.4 Å C= 0.12E+16	20000. 0.938E-04 50000. 0.787E-04 100000. 0.682E-04 200000. 0.582E-04	0.340E-04 0.258E-04 0.212E-04 0.175E-04	0.103E-04 0.148E-04 0.188E-04 0.223E-04	0.116E-04 0.147E-04 0.175E-04 0.187E-04	0.905E-05 0.978E-05 0.158E-04 0.165E-04	0.978E-05 0.123E-04 0.142E-04 0.188E-04	0.200000. 0.500000. 0.100000. 0.200000.	0.164E-02 0.146E-02 0.132E-02 0.116E-02	0.267E-03 0.354E-03 0.442E-03 0.504E-03	0.267E-03 0.354E-03 0.442E-03 0.504E-03	0.228E-03 0.296E-03 0.350E-03 0.385E-03	0.228E-03 0.296E-03 0.350E-03 0.385E-03	0.228E-03 0.296E-03 0.350E-03 0.385E-03
C IV 2P-7S 239.1 Å C= 0.71E+15	20000. 0.159E-03 50000. 0.138E-03 100000. 0.122E-03 200000. 0.107E-03	0.683E-04 0.503E-04 0.411E-04 0.320E-04	0.223E-04 0.313E-04 0.372E-04 0.320E-04	0.234E-04 0.300E-04 0.334E-04 0.320E-04	0.192E-04 0.258E-04 0.336E-04 0.388E-04	0.200E-04 0.250E-04 0.271E-04 0.307E-04	0.200000. 0.500000. 0.100000. 0.200000.	0.245E-02 0.224E-02 0.205E-02 0.180E-02	0.455E-03 0.529E-03 0.690E-03 0.745E-03	0.455E-03 0.529E-03 0.690E-03 0.745E-03	0.398E-03 0.513E-03 0.555E-03 0.597E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03
C IV 2P-8S 234.1 Å C= 0.45E+15	20000. 0.259E-03 50000. 0.232E-03 100000. 0.210E-03 200000. 0.184E-03	0.683E-04 0.503E-04 0.411E-04 0.340E-04	0.223E-04 0.313E-04 0.372E-04 0.320E-04	0.234E-04 0.300E-04 0.334E-04 0.320E-04	0.192E-04 0.258E-04 0.336E-04 0.388E-04	0.200E-04 0.250E-04 0.271E-04 0.307E-04	0.200000. 0.500000. 0.100000. 0.200000.	0.245E-02 0.224E-02 0.205E-02 0.180E-02	0.455E-03 0.529E-03 0.690E-03 0.745E-03	0.455E-03 0.529E-03 0.690E-03 0.745E-03	0.398E-03 0.513E-03 0.555E-03 0.597E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03
C IV 2P-9S 230.9 Å C= 0.31E+15	20000. 0.404E-03 50000. 0.373E-03 100000. 0.342E-03 200000. 0.308E-03	0.200E-03 0.150E-03 0.116E-03 0.878E-04	0.431E-04 0.596E-04 0.649E-04 0.878E-04	0.444E-04 0.530E-04 0.616E-04 0.878E-04	0.349E-04 0.478E-04 0.564E-04 0.878E-04	0.365E-04 0.451E-04 0.483E-04 0.878E-04	0.200000. 0.500000. 0.100000. 0.200000.	0.188E-02 0.144E-02 0.117E-02 0.937E-03	0.193E-03 0.259E-04 0.483E-04 0.794E-04	0.193E-03 0.259E-04 0.483E-04 0.794E-04	0.393E-03 0.513E-03 0.649E-03 0.687E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03
C IV 2P-7D 245.8 Å C= 0.19E+14	20000. 0.256E-03 50000. 0.194E-03 100000. 0.159E-03 200000. 0.127E-03	0.163E-04 0.108E-04 0.695E-05 0.390E-05	0.130E-03 0.174E-03 0.188E-03 0.218E-03	0.124E-03 0.147E-03 0.162E-03 0.205E-03	0.106E-03 0.138E-03 0.164E-03 0.181E-03	0.103E-03 0.124E-03 0.138E-03 0.143E-03	0.200000. 0.500000. 0.100000. 0.200000.	0.297E-02 0.231E-02 0.181E-02 0.152E-02	0.105E-03 0.125E-03 0.134E-03 0.157E-03	0.105E-03 0.125E-03 0.134E-03 0.157E-03	0.139E-03 0.149E-03 0.158E-03 0.171E-03	0.111E-02 0.138E-02 0.172E-03 0.191E-03	0.111E-02 0.138E-02 0.172E-03 0.191E-03
C IV 2P-6D 234.7 Å C= 0.17E+14	20000. 0.450E-03 50000. 0.350E-03 100000. 0.286E-03 200000. 0.230E-03	0.900E-03 0.530E-03 0.320E-03 0.172E-03	0.756E-04 0.996E-04 0.188E-03 0.390E-05	0.766E-04 0.915E-04 0.104E-03 0.218E-03	0.670E-04 0.863E-04 0.935E-04 0.205E-03	0.631E-04 0.724E-04 0.854E-04 0.104E-03	0.200000. 0.500000. 0.100000. 0.200000.	0.186E-02 0.231E-02 0.205E-02 0.152E-02	0.186E-03 0.259E-04 0.483E-04 0.794E-04	0.186E-03 0.259E-04 0.483E-04 0.794E-04	0.393E-03 0.513E-03 0.649E-03 0.687E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03
C IV 2P-7P 238.7 Å C= 0.17E+14	20000. 0.450E-03 50000. 0.350E-03 100000. 0.286E-03 200000. 0.230E-03	0.900E-03 0.530E-03 0.320E-03 0.172E-03	0.756E-04 0.996E-04 0.188E-03 0.390E-05	0.766E-04 0.915E-04 0.104E-03 0.218E-03	0.670E-04 0.863E-04 0.935E-04 0.205E-03	0.631E-04 0.724E-04 0.854E-04 0.104E-03	0.200000. 0.500000. 0.100000. 0.200000.	0.186E-02 0.231E-02 0.205E-02 0.152E-02	0.186E-03 0.259E-04 0.483E-04 0.794E-04	0.186E-03 0.259E-04 0.483E-04 0.794E-04	0.393E-03 0.513E-03 0.649E-03 0.687E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03	0.375E-03 0.431E-03 0.507E-03 0.617E-03
C IV 3S-6P 59.5 Å C= 0.21E+16	20000. 0.900E-03 50000. 0.744E-03 100000. 0.640E-03 200000. 0.540E-03	0.756E-04 0.595E-04 0.428E-04 0.375E-04	0.210E-03 0.261E-03 0.314E-03 0.375E-04	0.189E-03 0.228E-03 0.269E-03 0.328E-03	0.154E-03 0.188E-03 0.206E-03 0.245E-03	0.100E-03 0.138E-03 0.164E-03 0.181E-03	0.879E-04 0.109E-03 0.129E-03 0.144E-03	0.849E-04 0.109E-03 0.129E-03 0.144E-03	0.849E-04 0.109E-03 0.129E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.718E-03 0.937E-03 0.115E-03 0.150E-03	0.718E-03 0.937E-03 0.115E-03 0.150E-03
C IV 3S-7P 55.2 Å C= 0.11E+16	20000. 0.100E-02 50000. 0.105E-02 100000. 0.105E-02 200000. 0.105E-02	0.131E-03 0.981E-04 0.671E-05 0.375E-05	0.207E-04 0.227E-04 0.213E-05 0.355E-05	0.178E-03 0.193E-03 0.176E-03 0.318E-03	0.149E-03 0.189E-03 0.170E-03 0.342E-03	0.121E-03 0.150E-03 0.144E-03 0.261E-03	0.205E-03 0.237E-03 0.237E-03 0.168E-03	0.205E-03 0.237E-03 0.237E-03 0.168E-03	0.205E-03 0.237E-03 0.237E-03 0.168E-03	0.447E-02 0.447E-02 0.447E-02 0.447E-02	0.447E-02 0.447E-02 0.447E-02 0.447E-02	0.447E-02 0.447E-02 0.447E-02 0.447E-02	0.447E-02 0.447E-02 0.447E-02 0.447E-02
C IV 3D-6F 682.5 Å C= 0.14E+14	20000. 0.140E-02 50000. 0.120E-02 100000. 0.100E-02 200000. 0.100E-02	0.217E-03 0.252E-03 0.262E-03 0.318E-03	0.201E-03 0.251E-03 0.262E-03 0.318E-03	0.189E-03 0.245E-03 0.263E-03 0.342E-03	0.100E-03 0.149E-03 0.170E-03 0.242E-03	0.100E-03 0.149E-03 0.170E-03 0.242E-03	0.879E-04 0.129E-03 0.150E-03 0.242E-03	0.879E-04 0.129E-03 0.150E-03 0.242E-03	0.879E-04 0.129E-03 0.150E-03 0.242E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03
C IV 3D-7F 627.1 Å C= 0.76E+13	20000. 0.181E-02 50000. 0.160E-02 100000. 0.140E-02 200000. 0.140E-02	0.217E-03 0.252E-03 0.262E-03 0.318E-03	0.201E-03 0.251E-03 0.262E-03 0.318E-03	0.189E-03 0.245E-03 0.263E-03 0.342E-03	0.100E-03 0.149E-03 0.170E-03 0.242E-03	0.100E-03 0.149E-03 0.170E-03 0.242E-03	0.879E-04 0.129E-03 0.150E-03 0.242E-03	0.879E-04 0.129E-03 0.150E-03 0.242E-03	0.879E-04 0.129E-03 0.150E-03 0.242E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03	0.655E-05 0.879E-05 0.109E-03 0.144E-03