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Preliminary report

STARK BROADENING PARAMETER TABLES FOR Ca IX AND Ca X

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SUMMARY: Using a semiclassical approach, we have calculated electron–, proton–, and He III–impact line widths and shifts for 4 Ca IX and 48 Ca X multiplets as a function of temperature and perturber density.

1. INTRODUCTION

Stark broadening parameters of Ca IX and Ca X spectral lines are obviously of interest for the laboratory plasmas, fusion plasmas and laser produced plasmas research as well as for testing and developping of the Stark broadening theory for multicharged ion lines. Due to the abundance of calcium, such data are of interest also for the consideration of solar and stellar plasma, particularly for subphotosperic layers as well as radiative transfer considerations.

In order to continue our efforts to provide to astrophysicists and plasma physicists Stark broadening data needed for the consideration and modeling of astrophysical and laboratory plasmas as well as laser produced and fusion plasmas, we have calculated within the semiclassical-perturbation formalism (Sahal–Bréchot, 1969ab, see also Sahal - Bréchot, 1974, Fleurier et al, 1977, Dimitrijević and Sahal - Bréchot, 1984,Dimitrijević et al. 1991, Dimitrijević and Sahal - Bréchot, 1995) electron-, proton-, and He III-impact line widths and shifts for 4 Ca IX and 48 Ca X multiplets. The used formalism has been reviewed briefly in Dimitrijević and Sahal - Bréchot, 1995.

2. RESULTS AND DISCUSSION

All relevant details concerning the obtained results and the calculation procedure will be published in Dimitrijević and Sahal–Bréchot, 1997. Here, we present only tables of Stark broadening parameters. Atomic energy levels needed for calculations have been taken from Bashkin and Stoner (1975). Our results for 4 Ca IX and 48 Ca X multiplets are shown in Tables 1 and 2, for perturber densities $10^{18} - 10^{22}$ cm^{-3} and $10^{17} - 10^{22}$ cm^{-3} respectively. In both cases the temperature range is T = 200,000 – 5,000,000 K. The complete set of data is given for the perturber density of 10^{19}cm^{-3} for Ca IX and 10^{17}cm^{-3} for Ca X. For lower tabulated perturber densities, only data for higher transitions, needed for better interpolation are given. Stark broadening parameters for densities lover than tabulated, are linear with perturber density. We also specify a parameter c (Dimitrijević and 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 full width at half maximum. For each value given in Table 1, the collision volume (V) multiplied by the perturber

Table 1. This table shows electron-, proton-, and He III-impact broadening parameters for Ca IX for perturber densities of $10^{18} - 10^{22}$ cm^{-3} and temperatures from 200,000 up to 2,000,000 K. The complete set of data is for the electron density of 10^{19}cm^{-3} and for 10^{18}cm^{-3} only data needed for more accurate interpolation are given. Stark broadening parameters for densities lower than tabulated, are linear with perturber density. Transitions and averaged wavelengths for the multiplet (in Å) are also given in the table. By dividing c by the corresponding full width at half maximum (Dimitrijević et *al.*, 1991), we obtain an estimate for the maximum perturber density for which the line may be treated as isolated and tabulated data may be used. The asterisk identifies cases for which the collision volume multiplied by the perturber density (the condition for validity of the impact approximation) lies between 0.1 and 0.5.

PERTURBER DENSITY = 1.E+18cm-3							
PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca IX 3P 5S	200000.	0.768E-03	0.953E-04	0.640E-04	0.103E-03	0.128E-03	0.200E-03
116.1 Å	500000.	0.551E-03	0.932E-04	0.133E-03	0.147E-03	0.267E-03	0.298E-03
C=0.29E+19	1000000.	0.439E-03	0.893E-04	0.178E-03	0.178E-03	0.352E-03	0.359E-03
	2000000.	0.355E-03	0.766E-04	0.231E-03	0.211E-03	0.438E-03	0.427E-03
	3000000.	0.314E-03	0.671E-04	0.262E-03	0.228E-03	0.492E-03	0.460E-03
	5000000.	0.269E-03	0.562E-04	0.318E-03	0.254E-03	0.560E-03	0.516E-03
PERTURBER DENSITY = 1.E+19cm-3							
Ca IX 3S 3P	200000.	0.334E-01	-0.344E-03	0.305E-03	-0.148E-03	0.587E-03	-0.279E-03
466.2 Å	500000.	0.216E-01	-0.302E-03	0.879E-03	-0.368E-03	0.172E-02	-0.731E-03
C=0.47E+22	1000000.	0.160E-01	-0.400E-03	0.144E-02	-0.620E-03	0.285E-02	-0.124E-02
	2000000.	0.122E-01	-0.350E-03	0.201E-02	-0.872E-03	0.399E-02	-0.176E-02
	3000000.	0.106E-01	-0.340E-03	0.219E-02	-0.103E-02	0.437E-02	-0.207E-02
	5000000.	0.899E-02	-0.329E-03	0.247E-02	-0.117E-02	0.488E-02	-0.236E-02
Ca IX 3P 4S	200000.	0.816E-02	0.445E-03	0.172E-03	0.424E-03	0.338E-03	0.798E-03
178.6 Å	500000.	0.559E-02	0.564E-03	0.515E-03	0.755E-03	0.103E-02	0.150E-02
C=0.18E+21	1000000.	0.434E-02	0.535E-03	0.914E-03	0.996E-03	0.183E-02	0.201E-02
	2000000.	0.344E-02	0.510E-03	0.122E-02	0.120E-02	0.243E-02	0.242E-02
	3000000.	0.303E-02	0.471E-03	0.142E-02	0.132E-02	0.279E-02	0.267E-02
	5000000.	0.260E-02	0.403E-03	0.174E-02	0.150E-02	0.322E-02	0.301E-02
Ca IX 3P 5S	200000.	0.768E-02	0.889E-03	0.639E-03	0.957E-02	*0.129E-02	*0.175E-02
116.1 Å	500000.	0.551E-02	0.885E-03	0.132E-02	0.145E-02	*0.267E-02	*0.287E-02
C=0.29E+20	1000000.	0.439E-02	0.875E-03	0.178E-02	0.178E-02	*0.352E-02	*0.358E-02
	2000000.	0.355E-02	0.763E-03	0.231E-02	0.211E-02	*0.438E-02	*0.426E-02
	3000000.	0.314E-02	0.668E-03	0.262E-02	0.228E-02	*0.492E-02	*0.460E-02
	5000000.	0.269E-02	0.562E-03	0.318E-02	0.254E-02	0.560E-02	0.516E-02
Ca IX 3P 3D	200000.	0.272E-01	-0.805E-04	0.435E-03	-0.549E-04	0.840E-03	-0.103E-03
395.0 Å	500000.	0.176E-01	-0.856E-04	0.110E-02	-0.140E-03	0.216E-02	-0.279E-03
C=0.33E+22	1000000.	0.130E-01	-0.145E-03	0.165E-02	-0.248E-03	0.325E-02	-0.498E-03
	2000000.	0.995E-02	-0.108E-03	0.210E-02	-0.367E-03	0.418E-02	-0.740E-03
	3000000.	0.865E-02	-0.115E-03	0.227E-02	-0.449E-03	0.452E-02	-0.905E-03
	5000000.	0.737E-02	-0.108E-03	0.247E-02	-0.523E-03	0.491E-02	-0.106E-02
PERTURBER DENSITY = 1.E+20cm-3							
Ca IX 3S 3P	200000.	0.334	-0.323E-02	0.301E-02	-0.131E-02	0.562E-02	-0.220E-02
466.2 Å	500000.	0.216	-0.290E-02	0.878E-02	-0.356E-02	0.171E-01	-0.677E-02
C=0.47E+23	1000000.	0.160	-0.388E-02	0.144E-01	-0.614E-02	0.285E-01	-0.121E-01
	2000000.	0.122	-0.346E-02	0.201E-01	-0.871E-02	0.399E-01	-0.176E-01
	3000000.	0.106	-0.337E-02	0.219E-01	-0.102E-01	0.437E-01	-0.207E-01
	5000000.	0.899E-01	-0.328E-02	0.247E-01	-0.117E-01	0.488E-01	-0.236E-01
Ca IX 3P 4S	200000.	0.816E-01	0.381E-02	0.171E-02	0.370E-02	*0.334E-02	*0.604E-02
178.6 Å	500000.	0.559E-01	0.524E-02	0.514E-02	0.718E-02	*0.103E-01	*0.133E-01
C=0.18E+22	1000000.	0.434E-01	0.504E-02	0.914E-02	0.978E-02	*0.183E-01	*0.189E-01
	2000000.	0.344E-01	0.497E-02	0.122E-01	0.119E-01	*0.243E-01	*0.241E-01
	3000000.	0.303E-01	0.460E-02	0.142E-01	0.132E-01	*0.279E-01	*0.266E-01
	5000000.	0.260E-01	0.401E-02	0.174E-01	0.150E-01	0.322E-01	0.300E-01
Ca IX 3P 5S	200000.	0.768E-01	0.674E-02	*0.639E-02	*0.781E-02		
116.1 Å	500000.	0.551E-01	0.752E-02	*0.133E-01	*0.133E-01		
C=0.29E+21	1000000.	0.439E-01	0.768E-02	*0.178E-01	*0.172E-01		
	2000000.	0.355E-01	0.720E-02	*0.231E-01	*0.210E-01		
	3000000.	0.314E-01	0.634E-02	*0.262E-01	*0.227E-01		
	5000000.	0.269E-01	0.554E-02	*0.318E-01	*0.254E-01		

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca IX 3P 3D	200000.	0.272	-0.672E-03	0.429E-02	-0.487E-03	0.802E-02	-0.815E-03
395.0 Å	500000.	0.176	-0.808E-03	0.110E-01	-0.136E-02	0.215E-01	-0.259E-02
C=0.33E+23	1000000.	0.130	-0.139E-02	0.165E-01	-0.246E-02	0.325E-01	-0.484E-02
	2000000.	0.995E-01	-0.107E-02	0.210E-01	-0.367E-02	0.418E-01	-0.739E-02
	3000000.	0.865E-01	-0.114E-02	0.227E-01	-0.449E-02	0.452E-01	-0.904E-02
	5000000.	0.737E-01	-0.108E-02	0.247E-01	-0.523E-02	0.491E-01	-0.106E-01
PERTURBER DENSITY = 1.E+21cm-3							
Ca IX 3S 3P	200000.	3.34	-0.257E-01	0.262E-01	-0.867E-02	*0.395E-01	-0.999E-02
466.2 Å	500000.	2.16	-0.251E-01	0.867E-01	-0.320E-01	*0.165	-0.554E-01
C=0.47E+24	1000000.	1.60	-0.360E-01	0.144	-0.589E-01	*0.281	-0.110
	2000000.	1.22	-0.324E-01	0.200	-0.859E-01	*0.398	-0.167
	3000000.	1.06	-0.322E-01	0.219	-0.102	*0.436	-0.203
	5000000.	0.899	-0.320E-01	0.247	-0.117	0.488	-0.235
Ca IX 3P 4S	200000.	0.815	0.142E-01	*0.163E-01	*0.225E-01		
178.6 Å	500000.	0.559	0.388E-01	*0.513E-01	*0.600E-01		
C=0.18E+23	1000000.	0.434	0.410E-01	*0.913E-01	*0.895E-01		
	2000000.	0.344	0.423E-01	*0.122	*0.115		
	3000000.	0.303	0.410E-01	*0.142	*0.131		
	5000000.	0.260	0.374E-01	0.174	0.149		
Ca IX 3P 5S	200000.	*0.724	-0.115E-01				
116.1 Å	500000.	0.529	0.307E-01				
C=0.29E+22	1000000.	0.424	0.461E-01				
	2000000.	0.345	0.470E-01				
	3000000.	0.305	0.457E-01				
	5000000.	0.262	0.461E-01				
Ca IX 3P 3D	200000.	2.72	-0.425E-02	0.371E-01	-0.322E-02	*0.549E-01	-0.371E-02
395.0 Å	500000.	1.76	-0.658E-02	0.108	-0.123E-01	*0.205	-0.213E-01
C=0.33E+24	1000000.	1.30	-0.130E-01	0.164	-0.236E-01	*0.320	-0.444E-01
	2000000.	0.995	-0.986E-02	0.210	-0.362E-01	*0.417	-0.707E-01
	3000000.	0.865	-0.108E-01	0.227	-0.448E-01	*0.451	-0.889E-01
	5000000.	0.737	-0.105E-01	0.247	-0.523E-01	0.491	-0.105
PERTURBER DENSITY = 1.E+22cm-3							
Ca IX 3S 3P	200000.	*33.3	*0.319E-01	*0.116	-0.240E-01		
466.2 Å	500000.	21.6	-0.114	*0.780	-0.228		
C=0.47E+25	1000000.	16.0	-0.270	*1.40	-0.509		
	2000000.	12.2	-0.261	*1.99	-0.791		
	3000000.	10.6	-0.266	*2.19	-0.967		
	5000000.	8.99	-0.275	2.46	-1.14		
Ca IX 3P 4S	200000.						
178.6 Å	500000.	*5.27	-0.646E-01				
C=0.18E+24	1000000.	4.15	0.112				
	2000000.	3.31	0.218				
	3000000.	2.93	0.234				
	5000000.	2.52	0.223				
Ca IX 3P 5S	200000.						
116.1 Å	500000.	*3.60	-0.414				
C=0.29E+23	1000000.	*3.18	-0.675E-01				
	2000000.	2.73	0.934E-01				
	3000000.	2.48	0.125				
	5000000.	2.18	0.143				
Ca IX 3P 3D	200000.	*27.2	*0.666E-01	*0.153	-0.897E-02		
395.0 Å	500000.	*17.6	-0.104E-01	*0.952	-0.886E-01		
C=0.33E+25	1000000.	13.0	-0.965E-01	*1.59	-0.207		
	2000000.	9.95	-0.763E-01	*2.07	-0.337		
	3000000.	8.64	-0.881E-01	*2.26	-0.428		
	5000000.	7.37	-0.882E-01	2.47	-0.514		

Table 2. This table shows electron-, proton-, and He III-impact broadening parameters for Ca X for perturber densities of $10^{17}-10^{22}$ cm^{-3} and temperatures from 200,000 up to 2,000,000 K. The complete set of data is for the electron density of 10^{18}cm^{-3} and for 10^{17}cm^{-3} only data needed for more accurate interpolation are given. Stark broadening parameters for densities lower than tabulated, are linear with perturber density. Transitions and averaged wavelengths for the multiplet (in Å) are also given in the table. By dividing c by the corresponding full width at half maximum (Dimitrijević et *al.*, 1991), we obtain an estimate for the maximum perturber density for which the line may be treated as isolated and tabulated data may be used. The asterisk identifies cases for which the collision volume multiplied by the perturber density (the condition for validity of the impact approximation) lies between 0.1 and 0.5.

PERTURBER DENSITY = 1.E+17cm-3

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4P 8S	200000.	0.902E-03	0.164E-03	0.165E-03	0.183E-03	0.333E-03	0.363E-03
163.6 Å	500000.	0.673E-03	0.155E-03	0.233E-03	0.233E-03	0.466E-03	0.466E-03
C=0.19E+18	1000000.	0.550E-03	0.134E-03	0.297E-03	0.265E-03	0.588E-03	0.540E-03
	2000000.	0.449E-03	0.106E-03	0.353E-03	0.301E-03	0.674E-03	0.614E-03
	3000000.	0.399E-03	0.923E-04	0.401E-03	0.329E-03	0.737E-03	0.665E-03
	5000000.	0.341E-03	0.762E-04	0.418E-03	0.361E-03	0.758E-03	0.711E-03
Ca X 5P 8S	200000.	0.409E-02	0.651E-03	0.667E-03	0.733E-03	0.135E-02	0.146E-02
328.5 Å	500000.	0.304E-02	0.610E-03	0.938E-03	0.933E-03	0.188E-02	0.187E-02
C=0.79E+18	1000000.	0.249E-02	0.528E-03	0.120E-02	0.106E-02	0.237E-02	0.217E-02
	2000000.	0.204E-02	0.414E-03	0.143E-02	0.121E-02	0.271E-02	0.246E-02
	3000000.	0.181E-02	0.361E-03	0.162E-02	0.133E-02	0.295E-02	0.266E-02
	5000000.	0.156E-02	0.297E-03	0.170E-02	0.144E-02	0.307E-02	0.285E-02
Ca X 6P 7S	200000.	0.463E-01	0.398E-02	0.464E-02	0.474E-02	0.928E-02	0.945E-02
1217.6 Å	500000.	0.343E-01	0.367E-02	0.659E-02	0.603E-02	0.132E-01	0.122E-01
C=0.17E+20	1000000.	0.280E-01	0.339E-02	0.828E-02	0.714E-02	0.163E-01	0.144E-01
	2000000.	0.232E-01	0.266E-02	0.980E-02	0.818E-02	0.188E-01	0.164E-01
	3000000.	0.208E-01	0.227E-02	0.113E-01	0.867E-02	0.211E-01	0.176E-01
	5000000.	0.182E-01	0.194E-02	0.135E-01	0.981E-02	0.230E-01	0.196E-01
Ca X 6P 8S	200000.	0.214E-01	0.270E-02	0.299E-02	0.317E-02	0.601E-02	0.631E-02
688.3 Å	500000.	0.160E-01	0.254E-02	0.417E-02	0.402E-02	0.838E-02	0.807E-02
C=0.34E+19	1000000.	0.131E-01	0.219E-02	0.534E-02	0.464E-02	0.105E-01	0.942E-02
	2000000.	0.108E-01	0.170E-02	0.636E-02	0.526E-02	0.120E-01	0.106E-01
	3000000.	0.966E-02	0.148E-02	0.705E-02	0.571E-02	0.130E-01	0.115E-01
	5000000.	0.837E-02	0.123E-02	0.764E-02	0.614E-02	0.135E-01	0.124E-01
Ca X 3P 7D	200000.	0.191E-03	0.835E-05	0.255E-04	0.202E-04	0.508E-04	0.403E-04
77.1 Å	500000.	0.141E-03	0.849E-05	0.340E-04	0.256E-04	0.664E-04	0.516E-04
C=0.33E+17	1000000.	0.115E-03	0.654E-05	0.419E-04	0.302E-04	0.803E-04	0.615E-04
	2000000.	0.951E-04	0.506E-05	0.511E-04	0.353E-04	0.915E-04	0.714E-04
	3000000.	0.856E-04	0.461E-05	0.551E-04	0.370E-04	0.963E-04	0.748E-04
	5000000.	0.754E-04	0.363E-05	0.674E-04	0.409E-04	0.109E-03	0.822E-04
Ca X 3P 8D	200000.	0.297E-03	0.158E-04	0.464E-04	0.361E-04	0.922E-04	0.715E-04
74.0 Å	500000.	0.224E-03	0.147E-04	0.604E-04	0.456E-04	0.119E-03	0.920E-04
C=0.21E+17	1000000.	0.184E-03	0.110E-04	0.740E-04	0.528E-04	0.140E-03	0.107E-03
	2000000.	0.154E-03	0.893E-05	0.859E-04	0.595E-04	0.156E-03	0.120E-03
	3000000.	0.139E-03	0.774E-05	0.976E-04	0.647E-04	0.168E-03	0.130E-03
	5000000.	0.122E-03	0.588E-05	0.109E-03	0.695E-04	0.174E-03	0.139E-03
Ca X 4P 4D	200000.	0.731E-02	0.303E-05	0.271E-03	0.784E-04	0.532E-03	0.156E-03
1151.1 Å	500000.	0.497E-02	0.193E-05	0.495E-03	0.156E-03	0.975E-03	0.315E-03
C=0.38E+20	1000000.	0.383E-02	0.274E-06	0.646E-03	0.218E-03	0.127E-02	0.439E-03
	2000000.	0.305E-02	-0.459E-05	0.767E-03	0.272E-03	0.145E-02	0.548E-03
	3000000.	0.270E-02	-0.134E-04	0.854E-03	0.302E-03	0.156E-02	0.611E-03
	5000000.	0.235E-02	-0.157E-04	0.982E-03	0.343E-03	0.169E-02	0.696E-03
Ca X 4P 5D	200000.	0.822E-03	0.191E-04	0.514E-04	0.375E-04	0.102E-03	0.750E-04
287.0 Å	500000.	0.576E-03	0.145E-04	0.852E-04	0.576E-04	0.169E-03	0.116E-03
C=0.12E+19	1000000.	0.454E-03	0.141E-04	0.106E-03	0.693E-04	0.204E-03	0.140E-03
	2000000.	0.368E-03	0.990E-05	0.131E-03	0.829E-04	0.242E-03	0.167E-03
	3000000.	0.328E-03	0.804E-05	0.149E-03	0.914E-04	0.266E-03	0.185E-03
	5000000.	0.287E-03	0.696E-05	0.174E-03	0.100E-03	0.294E-03	0.205E-03

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4P 6D	200000.	0.778E-03	0.256E-04	0.752E-04	0.598E-04	0.149E-03	0.119E-03
204.4 Å	500000.	0.560E-03	0.244E-04	0.110E-03	0.812E-04	0.217E-03	0.164E-03
C=0.36E+18	1000000.	0.450E-03	0.212E-04	0.136E-03	0.968E-04	0.260E-03	0.195E-03
	2000000.	0.370E-03	0.155E-04	0.168E-03	0.113E-03	0.307E-03	0.229E-03
	3000000.	0.332E-03	0.135E-04	0.183E-03	0.120E-03	0.326E-03	0.245E-03
	5000000.	0.291E-03	0.115E-04	0.221E-03	0.138E-03	0.358E-03	0.276E-03
Ca X 4P 7D	200000.	0.100E-02	0.414E-04	0.131E-03	0.103E-03	0.261E-03	0.205E-03
174.4 Å	500000.	0.741E-03	0.420E-04	0.175E-03	0.131E-03	0.341E-03	0.264E-03
C=0.17E+18	1000000.	0.605E-03	0.320E-04	0.215E-03	0.154E-03	0.412E-03	0.314E-03
	2000000.	0.501E-03	0.245E-04	0.261E-03	0.180E-03	0.469E-03	0.364E-03
	3000000.	0.451E-03	0.222E-04	0.283E-03	0.189E-03	0.494E-03	0.381E-03
	5000000.	0.397E-03	0.173E-04	0.345E-03	0.209E-03	0.560E-03	0.420E-03
Ca X 4P 8D	200000.	0.140E-02	0.719E-04	0.216E-03	0.167E-03	0.428E-03	0.331E-03
159.3 Å	500000.	0.105E-02	0.671E-04	0.280E-03	0.211E-03	0.551E-03	0.426E-03
C=0.97E+17	1000000.	0.867E-03	0.497E-04	0.343E-03	0.244E-03	0.648E-03	0.496E-03
	2000000.	0.723E-03	0.402E-04	0.398E-03	0.275E-03	0.722E-03	0.555E-03
	3000000.	0.652E-03	0.347E-04	0.452E-03	0.299E-03	0.780E-03	0.604E-03
	5000000.	0.575E-03	0.262E-04	0.505E-03	0.321E-03	0.806E-03	0.644E-03
Ca X 5P 5D	200000.	0.766E-01	0.783E-03	0.521E-02	0.216E-02	0.103E-01	0.430E-02
2398.9 Å	500000.	0.543E-01	0.233E-03	0.771E-02	0.338E-02	0.153E-01	0.682E-02
C=0.84E+20	1000000.	0.433E-01	0.259E-03	0.912E-02	0.414E-02	0.177E-01	0.835E-02
	2000000.	0.354E-01	0.500E-05	0.109E-01	0.491E-02	0.200E-01	0.997E-02
	3000000.	0.318E-01	-0.569E-04	0.120E-01	0.544E-02	0.213E-01	0.110E-01
	5000000.	0.279E-01	-0.373E-04	0.137E-01	0.597E-02	0.225E-01	0.122E-01
Ca X 5P 6D	200000.	0.642E-02	0.155E-03	0.597E-03	0.413E-03	0.119E-02	0.824E-03
548.3 Å	500000.	0.465E-02	0.134E-03	0.837E-03	0.564E-03	0.164E-02	0.114E-02
C=0.26E+19	1000000.	0.375E-02	0.114E-03	0.102E-02	0.672E-03	0.197E-02	0.137E-02
	2000000.	0.309E-02	0.753E-04	0.124E-02	0.790E-03	0.226E-02	0.159E-02
	3000000.	0.278E-02	0.648E-04	0.137E-02	0.838E-03	0.243E-02	0.171E-02
	5000000.	0.245E-02	0.556E-04	0.161E-02	0.948E-03	0.258E-02	0.190E-02
Ca X 5P 7D	200000.	0.499E-02	0.178E-03	0.623E-03	0.471E-03	0.124E-02	0.939E-03
375.1 Å	500000.	0.369E-02	0.175E-03	0.824E-03	0.598E-03	0.161E-02	0.121E-02
C=0.78E+18	1000000.	0.302E-02	0.130E-03	0.101E-02	0.708E-03	0.192E-02	0.144E-02
	2000000.	0.250E-02	0.967E-04	0.121E-02	0.819E-03	0.217E-02	0.166E-02
	3000000.	0.225E-02	0.878E-04	0.133E-02	0.862E-03	0.231E-02	0.176E-02
	5000000.	0.199E-02	0.674E-04	0.160E-02	0.953E-03	0.263E-02	0.193E-02
Ca X 5P 8D	200000.	0.557E-02	0.265E-03	0.832E-03	0.635E-03	0.165E-02	0.126E-02
311.4 Å	500000.	0.420E-02	0.243E-03	0.108E-02	0.801E-03	0.213E-02	0.162E-02
C=0.37E+18	1000000.	0.346E-02	0.178E-03	0.132E-02	0.931E-03	0.248E-02	0.189E-02
	2000000.	0.289E-02	0.142E-03	0.154E-02	0.104E-02	0.278E-02	0.211E-02
	3000000.	0.260E-02	0.122E-03	0.174E-02	0.114E-02	0.300E-02	0.231E-02
	5000000.	0.230E-02	0.915E-04	0.194E-02	0.123E-02	0.311E-02	0.245E-02
Ca X 6P 6D	200000.	0.509	0.388E-02	0.486E-01	0.216E-01	0.963E-01	0.431E-01
4298.3 Å	500000.	0.373	0.302E-02	0.621E-01	0.301E-01	0.122	0.606E-01
C=0.16E+21	1000000.	0.304	0.218E-02	0.737E-01	0.360E-01	0.141	0.732E-01
	2000000.	0.252	0.175E-03	0.863E-01	0.424E-01	0.155	0.851E-01
	3000000.	0.228	0.470E-04	0.963E-01	0.461E-01	0.164	0.926E-01
	5000000.	0.201	0.290E-03	0.107	0.496E-01	0.173	0.100
Ca X 6P 7D	200000.	0.354E-01	0.830E-03	0.414E-02	0.278E-02	0.825E-02	0.555E-02
930.4 Å	500000.	0.263E-01	0.834E-03	0.536E-02	0.354E-02	0.104E-01	0.714E-02
C=0.48E+19	1000000.	0.216E-01	0.575E-03	0.644E-02	0.419E-02	0.122E-01	0.845E-02
	2000000.	0.180E-01	0.386E-03	0.757E-02	0.482E-02	0.134E-01	0.959E-02
	3000000.	0.163E-01	0.356E-03	0.838E-02	0.507E-02	0.145E-01	0.103E-01
	5000000.	0.143E-01	0.268E-03	0.102E-01	0.573E-02	0.159E-01	0.115E-01
Ca X 6P 8D	200000.	0.238E-01	0.926E-03	0.336E-02	0.245E-02	0.668E-02	0.487E-02
617.3 Å	500000.	0.180E-01	0.848E-03	0.435E-02	0.311E-02	0.850E-02	0.629E-02
C=0.15E+19	1000000.	0.148E-01	0.599E-03	0.526E-02	0.361E-02	0.987E-02	0.732E-02
	2000000.	0.124E-01	0.466E-03	0.617E-02	0.406E-02	0.110E-01	0.822E-02
	3000000.	0.112E-01	0.400E-03	0.693E-02	0.440E-02	0.116E-01	0.882E-02
	5000000.	0.989E-02	0.295E-03	0.775E-02	0.469E-02	0.122E-01	0.944E-02

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3D 4P	200000.	0.166E-03	0.181E-05	0.527E-05	0.116E-05	0.103E-04	0.232E-05
206.9 Å	500000.	0.111E-03	0.214E-05	0.104E-04	0.251E-05	0.206E-04	0.505E-05
C=0.29E+19	1000000.	0.838E-04	0.232E-05	0.143E-04	0.371E-05	0.284E-04	0.748E-05
	2000000.	0.657E-04	0.219E-05	0.164E-04	0.501E-05	0.326E-04	0.101E-04
	3000000.	0.578E-04	0.214E-05	0.178E-04	0.559E-05	0.350E-04	0.113E-04
	5000000.	0.499E-04	0.195E-05	0.197E-04	0.636E-05	0.378E-04	0.128E-04
Ca X 3D 5P	200000.	0.132E-03	0.223E-05	0.874E-05	0.218E-05	0.172E-04	0.435E-05
126.6 Å	500000.	0.915E-04	0.298E-05	0.137E-04	0.379E-05	0.272E-04	0.764E-05
C=0.52E+18	1000000.	0.717E-04	0.289E-05	0.158E-04	0.514E-05	0.315E-04	0.104E-04
	2000000.	0.580E-04	0.273E-05	0.181E-04	0.614E-05	0.356E-04	0.124E-04
	3000000.	0.519E-04	0.252E-05	0.194E-04	0.684E-05	0.376E-04	0.138E-04
	5000000.	0.456E-04	0.219E-05	0.212E-04	0.768E-05	0.397E-04	0.155E-04
Ca X 3D 6P	200000.	0.177E-03	0.496E-05	0.174E-04	0.490E-05	0.343E-04	0.979E-05
105.4 Å	500000.	0.127E-03	0.522E-05	0.231E-04	0.754E-05	0.459E-04	0.152E-04
C=0.20E+18	1000000.	0.102E-03	0.492E-05	0.264E-04	0.909E-05	0.522E-04	0.184E-04
	2000000.	0.842E-04	0.457E-05	0.296E-04	0.108E-04	0.572E-04	0.219E-04
	3000000.	0.761E-04	0.411E-05	0.316E-04	0.120E-04	0.597E-04	0.243E-04
	5000000.	0.676E-04	0.340E-05	0.341E-04	0.133E-04	0.619E-04	0.269E-04
Ca X 4D 5P	200000.	0.198E-02	0.195E-04	0.125E-03	0.120E-04	0.247E-03	0.239E-04
454.7 Å	500000.	0.138E-02	0.277E-04	0.192E-03	0.240E-04	0.380E-03	0.483E-04
C=0.59E+19	1000000.	0.109E-02	0.261E-04	0.220E-03	0.334E-04	0.435E-03	0.674E-04
	2000000.	0.882E-03	0.254E-04	0.254E-03	0.417E-04	0.486E-03	0.844E-04
	3000000.	0.790E-03	0.243E-04	0.274E-03	0.465E-04	0.509E-03	0.941E-04
	5000000.	0.695E-03	0.213E-04	0.302E-03	0.529E-04	0.530E-03	0.107E-03
Ca X 4D 6P	200000.	0.119E-02	0.280E-04	0.112E-03	0.266E-04	0.222E-03	0.531E-04
263.8 Å	500000.	0.855E-03	0.291E-04	0.148E-03	0.416E-04	0.294E-03	0.839E-04
C=0.13E+19	1000000.	0.689E-03	0.270E-04	0.169E-03	0.508E-04	0.334E-03	0.103E-03
	2000000.	0.570E-03	0.253E-04	0.190E-03	0.605E-04	0.365E-03	0.122E-03
	3000000.	0.515E-03	0.230E-04	0.204E-03	0.668E-04	0.375E-03	0.135E-03
	5000000.	0.457E-03	0.189E-04	0.224E-03	0.731E-04	0.391E-03	0.148E-03
Ca X 5D 6P	200000.	0.148E-01	0.124E-03	0.132E-02	-0.349E-04	0.261E-02	-0.696E-04
851.5 Å	500000.	0.107E-01	0.177E-03	0.170E-02	-0.716E-04	0.337E-02	-0.144E-03
C=0.11E+20	1000000.	0.864E-02	0.157E-03	0.194E-02	-0.101E-03	0.378E-02	-0.204E-03
	2000000.	0.716E-02	0.174E-03	0.219E-02	-0.127E-03	0.408E-02	-0.257E-03
	3000000.	0.647E-02	0.162E-03	0.236E-02	-0.143E-03	0.419E-02	-0.288E-03
	5000000.	0.573E-02	0.128E-03	0.262E-02	-0.162E-03	0.431E-02	-0.327E-03
PERTURBER DENSITY = 1.E+18cm-3							
Ca X 3S 3P	200000.	0.498E-02	-0.601E-04	0.302E-04	-0.282E-04	0.585E-04	-0.551E-04
563.1 Å	500000.	0.322E-02	-0.532E-04	0.983E-04	-0.676E-04	0.192E-03	-0.135E-03
C=0.56E+21	1000000.	0.238E-02	-0.679E-04	0.179E-03	-0.113E-03	0.355E-03	-0.228E-03
	2000000.	0.180E-02	-0.605E-04	0.264E-03	-0.160E-03	0.523E-03	-0.322E-03
	3000000.	0.155E-02	-0.581E-04	0.303E-03	-0.188E-03	0.603E-03	-0.379E-03
	5000000.	0.130E-02	-0.561E-04	0.351E-03	-0.214E-03	0.684E-03	-0.433E-03
Ca X 3S 4P	200000.	0.481E-03	0.314E-05	0.138E-04	0.190E-05	0.270E-04	0.370E-05
111.0 Å	500000.	0.321E-03	0.343E-05	0.279E-04	0.438E-05	0.551E-04	0.878E-05
C=0.84E+19	1000000.	0.244E-03	0.303E-05	0.383E-04	0.691E-05	0.760E-04	0.139E-04
	2000000.	0.191E-03	0.315E-05	0.441E-04	0.951E-05	0.875E-04	0.192E-04
	3000000.	0.168E-03	0.310E-05	0.477E-04	0.107E-04	0.935E-04	0.216E-04
	5000000.	0.145E-03	0.267E-05	0.529E-04	0.123E-04	0.101E-03	0.248E-04
Ca X 3S 5P	200000.	0.571E-03	0.831E-05	0.366E-04	0.857E-05	0.720E-04	0.168E-04
82.8 Å	500000.	0.395E-03	0.112E-04	0.574E-04	0.152E-04	0.114E-03	0.307E-04
C=0.22E+19	1000000.	0.310E-03	0.103E-04	0.666E-04	0.208E-04	0.132E-03	0.419E-04
	2000000.	0.250E-03	0.994E-05	0.761E-04	0.249E-04	0.149E-03	0.502E-04
	3000000.	0.224E-03	0.910E-05	0.817E-04	0.275E-04	0.158E-03	0.556E-04
	5000000.	0.196E-03	0.773E-05	0.890E-04	0.310E-04	0.164E-03	0.631E-04
Ca X 3S 6P	200000.	0.858E-03	0.227E-04	0.830E-04	0.230E-04	0.164E-03	0.449E-04
73.2 Å	500000.	0.614E-03	0.238E-04	0.111E-03	0.358E-04	0.220E-03	0.720E-04
C=0.97E+18	1000000.	0.494E-03	0.221E-04	0.126E-03	0.432E-04	0.250E-03	0.874E-04
	2000000.	0.408E-03	0.206E-04	0.142E-03	0.515E-04	0.275E-03	0.104E-03
	3000000.	0.369E-03	0.185E-04	0.151E-03	0.573E-04	0.286E-03	0.115E-03
	5000000.	0.327E-03	0.151E-04	0.164E-03	0.632E-04	0.297E-03	0.127E-03

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4S 4P	200000.	0.103	-0.161E-02	0.259E-02	-0.175E-02	0.505E-02	-0.341E-02
1475.2 Å	500000.	0.698E-01	-0.234E-02	0.534E-02	-0.336E-02	0.106E-01	-0.676E-02
C=0.15E+22	1000000.	0.539E-01	-0.209E-02	0.766E-02	-0.463E-02	0.152E-01	-0.934E-02
	2000000.	0.428E-01	-0.194E-02	0.919E-02	-0.565E-02	0.182E-01	-0.114E-01
	3000000.	0.378E-01	-0.185E-02	0.103E-01	-0.626E-02	0.199E-01	-0.127E-01
	5000000.	0.326E-01	-0.157E-02	0.120E-01	-0.711E-02	0.222E-01	-0.144E-01
Ca X 4S 5P	200000.	0.651E-02	0.153E-04	0.377E-03	0.250E-04	0.741E-03	0.489E-04
267.0 Å	500000.	0.453E-02	0.195E-04	0.588E-03	0.531E-04	0.117E-02	0.107E-03
C=0.23E+20	1000000.	0.357E-02	0.214E-04	0.678E-03	0.771E-04	0.135E-02	0.155E-03
	2000000.	0.290E-02	0.217E-04	0.772E-03	0.101E-03	0.150E-02	0.203E-03
	3000000.	0.259E-02	0.159E-04	0.830E-03	0.112E-03	0.158E-02	0.226E-03
	5000000.	0.227E-02	0.134E-04	0.906E-03	0.128E-03	0.164E-02	0.258E-03
Ca X 4S 6P	200000.	0.591E-02	0.114E-03	0.542E-03	0.127E-03	0.107E-02	0.247E-03
187.4 Å	500000.	0.424E-02	0.109E-03	0.719E-03	0.202E-03	0.143E-02	0.406E-03
C=0.64E+19	1000000.	0.341E-02	0.102E-03	0.821E-03	0.247E-03	0.162E-02	0.499E-03
	2000000.	0.282E-02	0.952E-04	0.921E-03	0.295E-03	0.178E-02	0.595E-03
	3000000.	0.255E-02	0.826E-04	0.972E-03	0.324E-03	0.183E-02	0.653E-03
	5000000.	0.226E-02	0.661E-04	0.106E-02	0.360E-03	0.190E-02	0.732E-03
Ca X 5S 5P	200000.	1.05	-0.299E-01	0.545E-01	-0.355E-01	0.108	-0.692E-01
3061.4 Å	500000.	0.745	-0.305E-01	0.892E-01	-0.560E-01	0.178	-0.113
C=0.31E+22	1000000.	0.593	-0.296E-01	0.107	-0.685E-01	0.213	-0.138
	2000000.	0.483	-0.271E-01	0.129	-0.815E-01	0.250	-0.165
	3000000.	0.432	-0.236E-01	0.146	-0.900E-01	0.273	-0.182
	5000000.	0.378	-0.195E-01	0.166	-0.986E-01	0.294	-0.199
Ca X 5S 6P	200000.	0.514E-01	-0.467E-04	0.415E-02	-0.159E-03	0.819E-02	-0.311E-03
521.4 Å	500000.	0.371E-01	-0.117E-03	0.548E-02	-0.320E-03	0.109E-01	-0.644E-03
C=0.49E+20	1000000.	0.300E-01	-0.148E-03	0.623E-02	-0.446E-03	0.123E-01	-0.897E-03
	2000000.	0.248E-01	-0.131E-03	0.700E-02	-0.557E-03	0.133E-01	-0.112E-02
	3000000.	0.224E-01	-0.106E-03	0.745E-02	-0.618E-03	0.137E-01	-0.125E-02
	5000000.	0.198E-01	-0.105E-03	0.818E-02	-0.703E-03	0.141E-01	-0.143E-02
Ca X 6S 6P	200000.	7.11	-0.279	0.540	-0.350	1.07	-0.677
5528.8 Å	500000.	5.19	-0.266	0.754	-0.493	1.50	-0.994
C=0.55E+22	1000000.	4.22	-0.257	0.905	-0.594	1.79	-1.20
	2000000.	3.50	-0.208	1.08	-0.696	2.02	-1.39
	3000000.	3.15	-0.179	1.20	-0.755	2.18	-1.53
	5000000.	2.77	-0.151	1.37	-0.814	2.36	-1.65
Ca X 3P 4S	200000.	0.561E-03	0.277E-04	0.704E-05	0.237E-04	0.138E-04	0.464E-04
152.6 Å	500000.	0.380E-03	0.355E-04	0.282E-04	0.436E-04	0.564E-04	0.879E-04
C=0.16E+20	1000000.	0.292E-03	0.331E-04	0.495E-04	0.601E-04	0.988E-04	0.121E-03
	2000000.	0.230E-03	0.311E-04	0.712E-04	0.720E-04	0.142E-03	0.146E-03
	3000000.	0.202E-03	0.300E-04	0.835E-04	0.801E-04	0.164E-03	0.161E-03
	5000000.	0.172E-03	0.260E-04	0.102E-03	0.913E-04	0.192E-03	0.184E-03
Ca X 3P 5S	200000.	0.461E-03	0.464E-04	0.236E-04	0.475E-04	0.467E-04	0.929E-04
100.3 Å	500000.	0.327E-03	0.509E-04	0.570E-04	0.735E-04	0.114E-03	0.148E-03
C=0.33E+19	1000000.	0.260E-03	0.492E-04	0.838E-04	0.882E-04	0.168E-03	0.178E-03
	2000000.	0.210E-03	0.456E-04	0.108E-03	0.105E-03	0.215E-03	0.213E-03
	3000000.	0.186E-03	0.405E-04	0.130E-03	0.115E-03	0.251E-03	0.235E-03
	5000000.	0.160E-03	0.340E-04	0.151E-03	0.126E-03	0.287E-03	0.255E-03
Ca X 3P 6S	200000.	0.662E-03	0.996E-04	0.675E-04	0.103E-03	0.135E-03	0.199E-03
85.4 Å	500000.	0.486E-03	0.975E-04	0.131E-03	0.142E-03	0.262E-03	0.286E-03
C=0.13E+19	1000000.	0.393E-03	0.932E-04	0.170E-03	0.169E-03	0.340E-03	0.340E-03
	2000000.	0.322E-03	0.792E-04	0.221E-03	0.198E-03	0.431E-03	0.401E-03
	3000000.	0.286E-03	0.692E-04	0.243E-03	0.211E-03	0.470E-03	0.428E-03
	5000000.	0.246E-03	0.579E-04	0.289E-03	0.241E-03	0.521E-03	0.483E-03
Ca X 3P 7S	200000.	0.107E-02	0.189E-03	0.169E-03	0.205E-03	*0.339E-03	*0.392E-03
78.7 Å	500000.	0.796E-03	0.180E-03	0.260E-03	0.265E-03	*0.523E-03	*0.533E-03
C=0.70E+18	1000000.	0.649E-03	0.168E-03	0.336E-03	0.313E-03	*0.661E-03	*0.635E-03
	2000000.	0.532E-03	0.136E-03	0.412E-03	0.365E-03	*0.784E-03	*0.739E-03
	3000000.	0.473E-03	0.117E-03	0.452E-03	0.384E-03	0.863E-03	0.775E-03
	5000000.	0.406E-03	0.994E-04	0.546E-03	0.424E-03	0.993E-03	0.852E-03

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3P 8S	200000.	0.177E-02	0.332E-03	0.346E-03	0.373E-03		
75.0 Å	500000.	0.133E-02	0.321E-03	0.490E-03	0.488E-03	*0.977E-03	*0.975E-03
C=0.41E+18	1000000.	0.109E-02	0.284E-03	0.624E-03	0.556E-03	*0.123E-02	*0.113E-02
	2000000.	0.889E-03	0.224E-03	0.740E-03	0.633E-03	*0.142E-02	*0.129E-02
	3000000.	0.788E-03	0.196E-03	0.841E-03	0.690E-03	*0.155E-02	*0.140E-02
	5000000.	0.673E-03	0.162E-03	0.877E-03	0.759E-03	*0.159E-02	*0.149E-02
Ca X 4P 5S	200000.	0.914E-02	0.553E-03	0.377E-03	0.609E-03	0.745E-03	0.119E-02
364.8 Å	500000.	0.641E-02	0.613E-03	0.823E-03	0.944E-03	0.164E-02	0.190E-02
C=0.43E+20	1000000.	0.506E-02	0.589E-03	0.116E-02	0.114E-02	0.231E-02	0.229E-02
	2000000.	0.407E-02	0.543E-03	0.149E-02	0.136E-02	0.291E-02	0.275E-02
	3000000.	0.362E-02	0.478E-03	0.176E-02	0.150E-02	0.334E-02	0.303E-02
	5000000.	0.312E-02	0.398E-03	0.208E-02	0.163E-02	0.387E-02	0.334E-02
Ca X 4P 6S	200000.	0.565E-02	0.657E-03	0.472E-03	0.698E-03	0.940E-03	0.135E-02
223.3 Å	500000.	0.410E-02	0.644E-03	0.901E-03	0.963E-03	0.180E-02	0.194E-02
C=0.90E+19	1000000.	0.329E-02	0.613E-03	0.116E-02	0.115E-02	0.234E-02	0.231E-02
	2000000.	0.268E-02	0.519E-03	0.151E-02	0.134E-02	0.294E-02	0.273E-02
	3000000.	0.238E-02	0.451E-03	0.168E-02	0.143E-02	0.320E-02	0.290E-02
	5000000.	0.206E-02	0.376E-03	0.197E-02	0.164E-02	0.355E-02	0.328E-02
Ca X 4P 7S	200000.	0.649E-02	0.999E-03	0.912E-03	0.110E-02	*0.183E-02	*0.211E-02
182.5 Å	500000.	0.479E-02	0.952E-03	0.140E-02	0.142E-02	*0.281E-02	*0.286E-02
C=0.38E+19	1000000.	0.389E-02	0.890E-03	0.181E-02	0.168E-02	*0.355E-02	*0.341E-02
	2000000.	0.319E-02	0.715E-03	0.221E-02	0.196E-02	*0.421E-02	*0.396E-02
	3000000.	0.283E-02	0.617E-03	0.243E-02	0.206E-02	0.466E-02	0.417E-02
	5000000.	0.243E-02	0.521E-03	0.294E-02	0.228E-02	0.537E-02	0.457E-02
Ca X 4P 8S	200000.	0.902E-02	0.157E-02	0.165E-02	0.178E-02		
163.6 Å	500000.	0.673E-02	0.152E-02	0.233E-02	0.232E-02	*0.466E-02	*0.464E-02
C=0.19E+19	1000000.	0.550E-02	0.134E-02	0.297E-02	0.265E-02	*0.588E-02	*0.538E-02
	2000000.	0.449E-02	0.105E-02	0.353E-02	0.301E-02	*0.674E-02	*0.614E-02
	3000000.	0.399E-02	0.923E-03	0.401E-02	0.329E-02	*0.737E-02	*0.665E-02
	5000000.	0.341E-02	0.762E-03	0.418E-02	0.361E-02	*0.758E-02	*0.711E-02
Ca X 5P 6S	200000.	0.787E-01	0.613E-02	0.552E-02	0.676E-02	0.110E-01	0.131E-01
709.0 Å	500000.	0.570E-01	0.580E-02	0.960E-02	0.936E-02	0.193E-01	0.189E-01
C=0.91E+20	1000000.	0.459E-01	0.555E-02	0.124E-01	0.112E-01	0.243E-01	0.226E-01
	2000000.	0.376E-01	0.463E-02	0.156E-01	0.131E-01	0.295E-01	0.264E-01
	3000000.	0.336E-01	0.401E-02	0.176E-01	0.140E-01	0.329E-01	0.284E-01
	5000000.	0.292E-01	0.333E-02	0.200E-01	0.157E-01	0.355E-01	0.316E-01
Ca X 5P 7S	200000.	0.408E-01	0.497E-02	0.482E-02	0.561E-02	*0.965E-02	*0.107E-01
414.5 Å	500000.	0.300E-01	0.467E-02	0.726E-02	0.724E-02	*0.146E-01	*0.146E-01
C=0.19E+20	1000000.	0.244E-01	0.437E-02	0.937E-02	0.861E-02	*0.183E-01	*0.174E-01
	2000000.	0.200E-01	0.349E-02	0.115E-01	0.996E-02	*0.214E-01	*0.202E-01
	3000000.	0.179E-01	0.300E-02	0.127E-01	0.105E-01	0.237E-01	0.213E-01
	5000000.	0.155E-01	0.253E-02	0.152E-01	0.115E-01	0.278E-01	0.237E-01
Ca X 5P 8S	200000.	0.409E-01	0.619E-02	0.667E-02	0.713E-02		
328.5 Å	500000.	0.304E-01	0.597E-02	0.938E-02	0.930E-02	*0.188E-01	*0.186E-01
C=0.79E+19	1000000.	0.249E-01	0.527E-02	0.120E-01	0.106E-01	*0.237E-01	*0.216E-01
	2000000.	0.204E-01	0.412E-02	0.143E-01	0.121E-01	*0.271E-01	*0.246E-01
	3000000.	0.181E-01	0.361E-02	0.162E-01	0.133E-01	*0.295E-01	*0.266E-01
	5000000.	0.156E-01	0.297E-02	0.170E-01	0.144E-01	*0.307E-01	*0.285E-01
Ca X 6P 7S	200000.	0.463	0.383E-01	0.464E-01	0.464E-01	*0.928E-01	*0.891E-01
1217.6 Å	500000.	0.343	0.361E-01	0.659E-01	0.602E-01	*0.132	*0.121
C=0.17E+21	1000000.	0.280	0.338E-01	0.828E-01	0.714E-01	*0.163	*0.143
	2000000.	0.232	0.265E-01	0.980E-01	0.818E-01	*0.188	*0.164
	3000000.	0.208	0.227E-01	0.113	0.867E-01	0.211	0.176
	5000000.	0.182	0.194E-01	0.135	0.981E-01	0.230	0.196
Ca X 6P 8S	200000.	0.214	0.257E-01	0.299E-01	0.309E-01		
688.3 Å	500000.	0.160	0.248E-01	0.417E-01	0.401E-01	*0.838E-01	*0.803E-01
C=0.34E+20	1000000.	0.131	0.219E-01	0.534E-01	0.464E-01	*0.105	*0.937E-01
	2000000.	0.108	0.170E-01	0.636E-01	0.526E-01	*0.120	*0.106
	3000000.	0.966E-01	0.148E-01	0.705E-01	0.571E-01	*0.130	*0.115
	5000000.	0.837E-01	0.123E-01	0.764E-01	0.614E-01	*0.135	*0.124

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3P 3D	200000.	0.296E-02	-0.702E-05	0.307E-04	-0.502E-05	0.595E-04	-0.981E-05
417.1 Å	500000.	0.191E-02	-0.851E-05	0.875E-04	-0.125E-04	0.171E-03	-0.250E-04
C=0.31E+21	1000000.	0.140E-02	-0.141E-04	0.142E-03	-0.230E-04	0.280E-03	-0.461E-04
	2000000.	0.106E-02	-0.114E-04	0.194E-03	-0.360E-04	0.386E-03	-0.726E-04
	3000000.	0.910E-03	-0.114E-04	0.211E-03	-0.437E-04	0.419E-03	-0.881E-04
	5000000.	0.767E-03	-0.107E-04	0.233E-03	-0.532E-04	0.461E-03	-0.108E-03
Ca X 3P 4D	200000.	0.600E-03	0.682E-05	0.172E-04	0.123E-04	0.336E-04	0.241E-04
123.5 Å	500000.	0.403E-03	0.690E-05	0.362E-04	0.237E-04	0.715E-04	0.476E-04
C=0.44E+19	1000000.	0.307E-03	0.704E-05	0.532E-04	0.326E-04	0.104E-03	0.658E-04
	2000000.	0.241E-03	0.627E-05	0.662E-04	0.398E-04	0.125E-03	0.805E-04
	3000000.	0.212E-03	0.509E-05	0.760E-04	0.442E-04	0.137E-03	0.892E-04
	5000000.	0.182E-03	0.420E-05	0.899E-04	0.501E-04	0.154E-03	0.101E-03
Ca X 3P 5D	200000.	0.768E-03	0.235E-04	0.490E-04	0.405E-04	0.969E-04	0.792E-04
93.3 Å	500000.	0.536E-03	0.189E-04	0.843E-04	0.628E-04	0.167E-03	0.127E-03
C=0.13E+19	1000000.	0.421E-03	0.189E-04	0.106E-03	0.754E-04	0.205E-03	0.152E-03
	2000000.	0.339E-03	0.143E-04	0.132E-03	0.898E-04	0.247E-03	0.182E-03
	3000000.	0.302E-03	0.123E-04	0.154E-03	0.988E-04	0.274E-03	0.201E-03
	5000000.	0.263E-03	0.108E-04	0.176E-03	0.108E-03	0.302E-03	0.220E-03
Ca X 3P 6D	200000.	0.120E-02	0.423E-04	0.119E-03	0.966E-04	0.237E-03	0.187E-03
82.5 Å	500000.	0.862E-03	0.418E-04	0.176E-03	0.133E-03	0.347E-03	0.269E-03
C=0.59E+18	1000000.	0.692E-03	0.375E-04	0.219E-03	0.159E-03	0.418E-03	0.319E-03
	2000000.	0.567E-03	0.281E-04	0.271E-03	0.186E-03	0.494E-03	0.375E-03
	3000000.	0.509E-03	0.249E-04	0.296E-03	0.198E-03	0.525E-03	0.401E-03
	5000000.	0.447E-03	0.215E-04	0.359E-03	0.227E-03	0.579E-03	0.454E-03
Ca X 3P 7D	200000.	0.191E-02	0.770E-04	0.255E-03	0.198E-03	*0.506E-03	*0.379E-03
77.1 Å	500000.	0.141E-02	0.822E-04	0.340E-03	0.256E-03	*0.664E-03	*0.514E-03
C=0.33E+18	1000000.	0.115E-02	0.650E-04	0.419E-03	0.302E-03	*0.802E-03	*0.613E-03
	2000000.	0.951E-03	0.503E-04	0.511E-03	0.353E-03	*0.915E-03	*0.714E-03
	3000000.	0.856E-03	0.461E-04	0.551E-03	0.370E-03	*0.963E-03	*0.748E-03
	5000000.	0.754E-03	0.363E-04	0.674E-03	0.409E-03	0.109E-02	0.822E-03
Ca X 3P 8D	200000.	0.297E-02	0.141E-03	*0.464E-03	*0.351E-03		
74.0 Å	500000.	0.224E-02	0.141E-03	0.604E-03	0.454E-03		
C=0.21E+18	1000000.	0.184E-02	0.109E-03	0.740E-03	0.528E-03	*0.140E-02	*0.107E-02
	2000000.	0.154E-02	0.884E-04	0.859E-03	0.595E-03	*0.156E-02	*0.120E-02
	3000000.	0.139E-02	0.774E-04	0.976E-03	0.647E-03	*0.168E-02	*0.130E-02
	5000000.	0.122E-02	0.588E-04	0.109E-02	0.695E-03	*0.174E-02	*0.139E-02
Ca X 4P 4D	200000.	0.731E-01	0.414E-05	0.271E-02	0.777E-03	0.532E-02	0.152E-02
1151.1 Å	500000.	0.497E-01	0.895E-05	0.495E-02	0.156E-02	0.975E-02	0.314E-02
C=0.38E+21	1000000.	0.383E-01	0.212E-05	0.646E-02	0.218E-02	0.127E-01	0.438E-02
	2000000.	0.305E-01	-0.465E-04	0.767E-02	0.272E-02	0.145E-01	0.548E-02
	3000000.	0.270E-01	-0.134E-03	0.854E-02	0.302E-02	0.156E-01	0.611E-02
	5000000.	0.235E-01	-0.157E-03	0.982E-02	0.343E-02	0.169E-01	0.696E-02
Ca X 4P 5D	200000.	0.822E-02	0.185E-03	0.514E-03	0.371E-03	0.102E-02	0.724E-03
287.0 Å	500000.	0.576E-02	0.142E-03	0.852E-03	0.576E-03	0.169E-02	0.116E-02
C=0.12E+20	1000000.	0.454E-02	0.141E-03	0.106E-02	0.693E-03	0.204E-02	0.140E-02
	2000000.	0.368E-02	0.987E-04	0.131E-02	0.829E-03	0.242E-02	0.167E-02
	3000000.	0.328E-02	0.804E-04	0.149E-02	0.914E-03	0.266E-02	0.185E-02
	5000000.	0.287E-02	0.696E-04	0.174E-02	0.100E-02	0.294E-02	0.205E-02
Ca X 4P 6D	200000.	0.778E-02	0.241E-03	0.752E-03	0.588E-03	0.149E-02	0.114E-02
204.4 Å	500000.	0.560E-02	0.238E-03	0.110E-02	0.811E-03	0.217E-02	0.164E-02
C=0.36E+19	1000000.	0.450E-02	0.211E-03	0.136E-02	0.968E-03	0.260E-02	0.194E-02
	2000000.	0.370E-02	0.154E-03	0.168E-02	0.113E-02	0.307E-02	0.229E-02
	3000000.	0.332E-02	0.135E-03	0.183E-02	0.120E-02	0.326E-02	0.245E-02
	5000000.	0.291E-02	0.115E-03	0.221E-02	0.138E-02	0.358E-02	0.276E-02
Ca X 4P 7D	200000.	0.100E-01	0.380E-03	0.131E-02	0.101E-02	*0.261E-02	*0.193E-02
174.4 Å	500000.	0.741E-02	0.407E-03	0.175E-02	0.130E-02	*0.341E-02	*0.263E-02
C=0.17E+19	1000000.	0.605E-02	0.318E-03	0.215E-02	0.154E-02	*0.412E-02	*0.313E-02
	2000000.	0.501E-02	0.243E-03	0.261E-02	0.180E-02	*0.469E-02	*0.364E-02
	3000000.	0.451E-02	0.222E-03	0.283E-02	0.189E-02	*0.494E-02	*0.381E-02
	5000000.	0.397E-02	0.173E-03	0.345E-02	0.209E-02	0.560E-02	0.420E-02

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4P 8D	200000.	0.140E-01	0.640E-03	*0.215E-02	*0.162E-02		
159.3 Å	500000.	0.105E-01	0.641E-03	0.280E-02	0.210E-02		
C=0.97E+18	1000000.	0.867E-02	0.493E-03	0.343E-02	0.244E-02	*0.648E-02	*0.494E-02
	2000000.	0.723E-02	0.398E-03	0.398E-02	0.275E-02	*0.722E-02	*0.555E-02
	3000000.	0.652E-02	0.347E-03	0.452E-02	0.299E-02	*0.780E-02	*0.604E-02
	5000000.	0.575E-02	0.262E-03	0.505E-02	0.321E-02	*0.806E-02	*0.644E-02
Ca X 5P 5D	200000.	0.766	0.744E-02	0.520E-01	0.213E-01	0.103	0.416E-01
2398.9 Å	500000.	0.543	0.212E-02	0.771E-01	0.338E-01	0.153	0.681E-01
C=0.84E+21	1000000.	0.433	0.257E-02	0.912E-01	0.414E-01	0.177	0.834E-01
	2000000.	0.354	0.289E-04	0.109	0.491E-01	0.200	0.997E-01
	3000000.	0.318	-0.569E-03	0.120	0.544E-01	0.213	0.110
	5000000.	0.279	-0.373E-03	0.137	0.597E-01	0.225	0.122
Ca X 5P 6D	200000.	0.642E-01	0.145E-02	0.597E-02	0.407E-02	*0.118E-01	*0.787E-02
548.3 Å	500000.	0.465E-01	0.131E-02	0.837E-02	0.563E-02	0.164E-01	0.113E-01
C=0.26E+20	1000000.	0.375E-01	0.114E-02	0.102E-01	0.672E-02	0.197E-01	0.136E-01
	2000000.	0.309E-01	0.747E-03	0.124E-01	0.790E-02	0.226E-01	0.159E-01
	3000000.	0.278E-01	0.648E-03	0.137E-01	0.838E-02	0.243E-01	0.171E-01
	5000000.	0.245E-01	0.556E-03	0.161E-01	0.948E-02	0.258E-01	0.190E-01
Ca X 5P 7D	200000.	0.499E-01	0.162E-02	0.622E-02	0.461E-02	*0.124E-01	*0.884E-02
375.1 Å	500000.	0.369E-01	0.169E-02	0.824E-02	0.597E-02	*0.161E-01	*0.120E-01
C=0.78E+19	1000000.	0.302E-01	0.130E-02	0.101E-01	0.708E-02	*0.192E-01	*0.143E-01
	2000000.	0.250E-01	0.958E-03	0.121E-01	0.819E-02	*0.217E-01	*0.166E-01
	3000000.	0.225E-01	0.878E-03	0.133E-01	0.862E-02	*0.231E-01	*0.176E-01
	5000000.	0.199E-01	0.674E-03	0.160E-01	0.953E-02	0.263E-01	0.193E-01
Ca X 5P 8D	200000.	0.557E-01	0.235E-02	*0.832E-02	*0.618E-02		
311.4 Å	500000.	0.420E-01	0.232E-02	0.108E-01	0.798E-02		
C=0.37E+19	1000000.	0.346E-01	0.176E-02	0.132E-01	0.931E-02		
	2000000.	0.289E-01	0.141E-02	0.154E-01	0.104E-01	*0.278E-01	*0.211E-01
	3000000.	0.260E-01	0.122E-02	0.174E-01	0.114E-01	*0.300E-01	*0.231E-01
	5000000.	0.230E-01	0.915E-03	0.194E-01	0.123E-01	*0.311E-01	*0.245E-01
Ca X 6P 6D	200000.	5.09	0.332E-01	0.486	0.213	*0.961	*0.412
4298.3 Å	500000.	3.73	0.281E-01	0.621	0.300	*1.22	*0.604
C=0.16E+22	1000000.	3.04	0.215E-01	0.737	0.360	1.41	0.730
	2000000.	2.52	0.147E-02	0.863	0.424	1.55	0.851
	3000000.	2.28	0.470E-03	0.963	0.461	1.64	0.926
	5000000.	2.01	0.290E-02	1.07	0.496	1.73	1.00
Ca X 6P 7D	200000.	0.354	0.737E-02	0.413E-01	0.272E-01	*0.822E-01	*0.523E-01
930.4 Å	500000.	0.263	0.797E-02	0.536E-01	0.353E-01	*0.104	*0.711E-01
C=0.48E+20	1000000.	0.216	0.570E-02	0.644E-01	0.419E-01	*0.122	*0.842E-01
	2000000.	0.180	0.381E-02	0.757E-01	0.482E-01	*0.134	*0.959E-01
	3000000.	0.163	0.356E-02	0.838E-01	0.507E-01	*0.145	*0.103
	5000000.	0.143	0.268E-02	0.102	0.573E-01	0.159	0.115
Ca X 6P 8D	200000.	0.238	0.810E-02	*0.336E-01	*0.239E-01		
617.3 Å	500000.	0.180	0.805E-02	0.435E-01	0.310E-01		
C=0.15E+20	1000000.	0.148	0.593E-02	0.526E-01	0.361E-01		
	2000000.	0.124	0.461E-02	0.617E-01	0.406E-01	*0.110	*0.822E-01
	3000000.	0.112	0.400E-02	0.693E-01	0.440E-01	*0.116	*0.882E-01
	5000000.	0.989E-01	0.295E-02	0.775E-01	0.469E-01	*0.122	*0.944E-01
Ca X 3D 4P	200000.	0.166E-02	0.208E-04	0.527E-04	0.115E-04	0.103E-03	0.226E-04
206.9 Å	500000.	0.111E-02	0.212E-04	0.104E-03	0.251E-04	0.206E-03	0.504E-04
C=0.29E+20	1000000.	0.838E-03	0.232E-04	0.143E-03	0.371E-04	0.284E-03	0.747E-04
	2000000.	0.657E-03	0.219E-04	0.164E-03	0.501E-04	0.326E-03	0.101E-03
	3000000.	0.578E-03	0.214E-04	0.178E-03	0.559E-04	0.350E-03	0.113E-03
	5000000.	0.499E-03	0.195E-04	0.197E-03	0.636E-04	0.378E-03	0.128E-03
Ca X 3D 5P	200000.	0.132E-02	0.231E-04	0.874E-04	0.216E-04	0.172E-03	0.422E-04
126.6 Å	500000.	0.915E-03	0.296E-04	0.137E-03	0.379E-04	0.272E-03	0.763E-04
C=0.52E+19	1000000.	0.717E-03	0.289E-04	0.158E-03	0.514E-04	0.315E-03	0.104E-03
	2000000.	0.580E-03	0.273E-04	0.181E-03	0.614E-04	0.356E-03	0.124E-03
	3000000.	0.519E-03	0.252E-04	0.194E-03	0.684E-04	0.376E-03	0.138E-03
	5000000.	0.456E-03	0.219E-04	0.212E-03	0.768E-04	0.397E-03	0.155E-03

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3D 6P	200000.	0.177E-02	0.497E-04	0.174E-03	0.484E-04	0.342E-03	0.946E-04
105.4 Å	500000.	0.127E-02	0.519E-04	0.231E-03	0.753E-04	0.459E-03	0.152E-03
C=0.20E+19	1000000.	0.102E-02	0.491E-04	0.264E-03	0.909E-04	0.522E-03	0.183E-03
	2000000.	0.842E-03	0.457E-04	0.296E-03	0.108E-03	0.572E-03	0.219E-03
	3000000.	0.761E-03	0.411E-04	0.316E-03	0.120E-03	0.597E-03	0.243E-03
	5000000.	0.676E-03	0.340E-04	0.341E-03	0.133E-03	0.619E-03	0.269E-03
Ca X 4D 5P	200000.	0.198E-01	0.197E-03	0.125E-02	0.119E-03	0.247E-02	0.233E-03
454.7 Å	500000.	0.138E-01	0.278E-03	0.192E-02	0.240E-03	0.380E-02	0.483E-03
C=0.59E+20	1000000.	0.109E-01	0.261E-03	0.220E-02	0.334E-03	0.435E-02	0.673E-03
	2000000.	0.882E-02	0.254E-03	0.254E-02	0.417E-03	0.486E-02	0.844E-03
	3000000.	0.790E-02	0.243E-03	0.274E-02	0.465E-03	0.509E-02	0.941E-03
	5000000.	0.695E-02	0.213E-03	0.302E-02	0.529E-03	0.530E-02	0.107E-02
Ca X 4D 6P	200000.	0.119E-01	0.277E-03	0.112E-02	0.263E-03	0.222E-02	0.513E-03
263.8 Å	500000.	0.855E-02	0.290E-03	0.148E-02	0.415E-03	0.294E-02	0.837E-03
C=0.13E+20	1000000.	0.689E-02	0.270E-03	0.169E-02	0.508E-03	0.334E-02	0.103E-02
	2000000.	0.570E-02	0.253E-03	0.190E-02	0.605E-03	0.365E-02	0.122E-02
	3000000.	0.515E-02	0.230E-03	0.204E-02	0.668E-03	0.375E-02	0.135E-02
	5000000.	0.457E-02	0.189E-03	0.224E-02	0.731E-03	0.391E-02	0.148E-02
Ca X 5D 6P	200000.	0.148	0.126E-02	0.132E-01	-0.346E-03	0.260E-01	-0.677E-03
851.5 Å	500000.	0.107	0.178E-02	0.170E-01	-0.716E-03	0.337E-01	-0.144E-02
C=0.11E+21	1000000.	0.864E-01	0.158E-02	0.194E-01	-0.101E-02	0.378E-01	-0.204E-02
	2000000.	0.716E-01	0.174E-02	0.219E-01	-0.127E-02	0.408E-01	-0.257E-02
	3000000.	0.647E-01	0.162E-02	0.236E-01	-0.143E-02	0.419E-01	-0.288E-02
	5000000.	0.573E-01	0.128E-02	0.262E-01	-0.162E-02	0.431E-01	-0.327E-02
PERTURBER DENSITY = 1.E+19cm-3							
Ca X 3S 3P	200000.	0.498E-01	-0.575E-03	0.302E-03	-0.268E-03	0.581E-03	-0.504E-03
563.1 Å	500000.	0.322E-01	-0.528E-03	0.983E-03	-0.671E-03	0.192E-02	-0.132E-02
C=0.56E+22	1000000.	0.238E-01	-0.681E-03	0.179E-02	-0.113E-02	0.355E-02	-0.228E-02
	2000000.	0.180E-01	-0.605E-03	0.264E-02	-0.160E-02	0.523E-02	-0.322E-02
	3000000.	0.155E-01	-0.580E-03	0.303E-02	-0.188E-02	0.603E-02	-0.379E-02
	5000000.	0.130E-01	-0.561E-03	0.351E-02	-0.214E-02	0.684E-02	-0.433E-02
Ca X 3S 4P	200000.	0.481E-02	0.313E-04	0.138E-03	0.180E-04	0.267E-03	0.338E-04
111.0 Å	500000.	0.321E-02	0.332E-04	0.279E-03	0.434E-04	0.550E-03	0.855E-04
C=0.84E+20	1000000.	0.244E-02	0.300E-04	0.383E-03	0.691E-04	0.760E-03	0.139E-03
	2000000.	0.191E-02	0.314E-04	0.441E-03	0.951E-04	0.875E-03	0.192E-03
	3000000.	0.168E-02	0.309E-04	0.477E-03	0.107E-03	0.935E-03	0.216E-03
	5000000.	0.145E-02	0.267E-04	0.529E-03	0.123E-03	0.101E-02	0.248E-03
Ca X 3S 5P	200000.	0.571E-02	0.795E-04	0.365E-03	0.811E-04	*0.710E-03	*0.152E-03
82.8 Å	500000.	0.395E-02	0.108E-03	0.574E-03	0.150E-03	*0.114E-02	*0.295E-03
C=0.22E+20	1000000.	0.310E-02	0.102E-03	0.666E-03	0.207E-03	*0.132E-02	*0.418E-03
	2000000.	0.250E-02	0.992E-04	0.761E-03	0.249E-03	0.149E-02	0.501E-03
	3000000.	0.224E-02	0.908E-04	0.817E-03	0.275E-03	0.158E-02	0.556E-03
	5000000.	0.196E-02	0.771E-04	0.890E-03	0.310E-03	0.164E-02	0.631E-03
Ca X 3S 6P	200000.	0.858E-02	0.214E-03	0.826E-03	0.215E-03		
73.2 Å	500000.	0.614E-02	0.227E-03	0.110E-02	0.352E-03		
C=0.97E+19	1000000.	0.494E-02	0.217E-03	0.126E-02	0.431E-03	*0.250E-02	*0.871E-03
	2000000.	0.408E-02	0.206E-03	0.142E-02	0.515E-03	*0.275E-02	*0.104E-02
	3000000.	0.369E-02	0.184E-03	0.151E-02	0.573E-03	*0.286E-02	*0.115E-02
	5000000.	0.327E-02	0.151E-03	0.164E-02	0.632E-03	*0.297E-02	*0.127E-02
Ca X 4S 4P	200000.	1.03	-0.154E-01	0.258E-01	-0.166E-01	0.501E-01	-0.310E-01
1475.2 Å	500000.	0.698	-0.228E-01	0.534E-01	-0.332E-01	0.106	-0.653E-01
C=0.15E+23	1000000.	0.539	-0.207E-01	0.766E-01	-0.463E-01	0.152	-0.933E-01
	2000000.	0.428	-0.193E-01	0.919E-01	-0.565E-01	0.182	-0.114
	3000000.	0.378	-0.185E-01	0.103	-0.626E-01	0.199	-0.127
	5000000.	0.326	-0.157E-01	0.120	-0.711E-01	0.222	-0.144
Ca X 4S 5P	200000.	0.651E-01	0.139E-03	0.375E-02	0.238E-03	*0.730E-02	*0.446E-03
267.0 Å	500000.	0.453E-01	0.186E-03	0.588E-02	0.526E-03	*0.116E-01	*0.103E-02
C=0.23E+21	1000000.	0.357E-01	0.211E-03	0.678E-02	0.770E-03	*0.135E-01	*0.155E-02
	2000000.	0.290E-01	0.216E-03	0.772E-02	0.101E-02	0.150E-01	0.203E-02
	3000000.	0.259E-01	0.159E-03	0.830E-02	0.112E-02	0.158E-01	0.226E-02
	5000000.	0.227E-01	0.134E-03	0.906E-02	0.128E-02	0.164E-01	0.258E-02

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4S 6P	200000.	0.591E-01	0.106E-02	0.539E-02	0.119E-02		
187.4 Å	500000.	0.424E-01	0.103E-02	0.718E-02	0.199E-02		
C=0.64E+20	1000000.	0.341E-01	0.101E-02	0.821E-02	0.247E-02	*0.162E-01	*0.497E-02
	2000000.	0.282E-01	0.949E-03	0.921E-02	0.295E-02	*0.178E-01	*0.594E-02
	3000000.	0.255E-01	0.823E-03	0.972E-02	0.324E-02	*0.183E-01	*0.653E-02
	5000000.	0.226E-01	0.658E-03	0.106E-01	0.360E-02	*0.190E-01	*0.732E-02
Ca X 5S 5P	200000.	10.5	-0.280	0.543	-0.333	*1.06	-0.617
3061.4 Å	500000.	7.45	-0.290	0.892	-0.552	*1.77	-1.07
C=0.31E+23	1000000.	5.93	-0.291	1.07	-0.683	*2.13	-1.38
	2000000.	4.83	-0.270	1.29	-0.815	*2.50	-1.64
	3000000.	4.32	-0.235	1.46	-0.900	2.73	-1.82
	5000000.	3.78	-0.194	1.66	-0.986	2.94	-1.99
Ca X 5S 6P	200000.	0.514	-0.405E-03	0.413E-01	-0.151E-02		
521.4 Å	500000.	0.371	-0.115E-02	0.548E-01	-0.317E-02		
C=0.49E+21	1000000.	0.300	-0.145E-02	0.623E-01	-0.445E-02	*0.123	-0.896E-02
	2000000.	0.248	-0.131E-02	0.700E-01	-0.557E-02	*0.133	-0.112E-01
	3000000.	0.224	-0.106E-02	0.745E-01	-0.618E-02	*0.137	-0.125E-01
	5000000.	0.198	-0.105E-02	0.818E-01	-0.703E-02	*0.141	-0.143E-01
Ca X 3P 4S	200000.	0.561E-02	0.267E-03	0.706E-04	0.225E-03	0.138E-03	0.421E-03
152.6 Å	500000.	0.380E-02	0.346E-03	0.282E-03	0.432E-03	0.564E-03	0.848E-03
C=0.16E+21	1000000.	0.292E-02	0.328E-03	0.495E-03	0.600E-03	0.988E-03	0.121E-02
	2000000.	0.230E-02	0.311E-03	0.712E-03	0.720E-03	0.142E-02	0.145E-02
	3000000.	0.202E-02	0.299E-03	0.835E-03	0.801E-03	0.164E-02	0.161E-02
	5000000.	0.172E-02	0.260E-03	0.102E-02	0.913E-03	0.192E-02	0.184E-02
Ca X 3P 5S	200000.	0.461E-02	0.438E-03	0.235E-03	0.445E-03	0.467E-03	0.823E-03
100.3 Å	500000.	0.327E-02	0.487E-03	0.569E-03	0.724E-03	0.114E-02	0.140E-02
C=0.33E+20	1000000.	0.260E-02	0.484E-03	0.838E-03	0.880E-03	0.168E-02	0.178E-02
	2000000.	0.210E-02	0.455E-03	0.108E-02	0.105E-02	0.215E-02	0.212E-02
	3000000.	0.186E-02	0.404E-03	0.130E-02	0.115E-02	0.251E-02	0.235E-02
	5000000.	0.160E-02	0.339E-03	0.151E-02	0.126E-02	0.287E-02	0.255E-02
Ca X 3P 6S	200000.	0.662E-02	0.916E-03	0.674E-03	0.942E-03	*0.135E-02	*0.169E-02
85.4 Å	500000.	0.486E-02	0.920E-03	0.131E-02	0.139E-02	*0.264E-02	*0.263E-02
C=0.13E+20	1000000.	0.393E-02	0.909E-03	0.170E-02	0.169E-02	*0.340E-02	*0.338E-02
	2000000.	0.322E-02	0.789E-03	0.221E-02	0.198E-02	*0.430E-02	*0.399E-02
	3000000.	0.286E-02	0.689E-03	0.243E-02	0.211E-02	*0.470E-02	*0.428E-02
	5000000.	0.246E-02	0.576E-03	0.289E-02	0.241E-02	*0.521E-02	*0.483E-02
Ca X 3P 7S	200000.	0.107E-01	0.167E-02	*0.169E-02	*0.182E-02		
78.7 Å	500000.	0.796E-02	0.165E-02	*0.260E-02	*0.256E-02		
C=0.70E+19	1000000.	0.649E-02	0.162E-02	*0.336E-02	*0.311E-02		
	2000000.	0.532E-02	0.135E-02	*0.412E-02	*0.365E-02		
	3000000.	0.473E-02	0.116E-02	*0.452E-02	*0.384E-02		
	5000000.	0.405E-02	0.986E-03	*0.546E-02	*0.424E-02		
Ca X 3P 8S	200000.	0.177E-01	0.280E-02				
75.0 Å	500000.	0.133E-01	0.284E-02				
C=0.41E+19	1000000.	0.109E-01	0.269E-02				
	2000000.	0.889E-02	0.222E-02	*0.740E-02	*0.633E-02		
	3000000.	0.788E-02	0.194E-02	*0.841E-02	*0.690E-02		
	5000000.	0.673E-02	0.160E-02	*0.877E-02	*0.759E-02		
Ca X 4P 5S	200000.	0.914E-01	0.519E-02	0.376E-02	0.570E-02	0.743E-02	0.106E-01
364.8 Å	500000.	0.641E-01	0.586E-02	0.823E-02	0.930E-02	0.164E-01	0.180E-01
C=0.43E+21	1000000.	0.506E-01	0.579E-02	0.116E-01	0.113E-01	0.231E-01	0.228E-01
	2000000.	0.407E-01	0.542E-02	0.149E-01	0.136E-01	0.291E-01	0.274E-01
	3000000.	0.362E-01	0.477E-02	0.176E-01	0.150E-01	0.334E-01	0.303E-01
	5000000.	0.312E-01	0.397E-02	0.208E-01	0.163E-01	0.387E-01	0.334E-01
Ca X 4P 6S	200000.	0.565E-01	0.603E-02	0.471E-02	0.639E-02	*0.939E-02	*0.115E-01
223.3 Å	500000.	0.410E-01	0.606E-02	0.900E-02	0.941E-02	*0.181E-01	*0.179E-01
C=0.90E+20	1000000.	0.329E-01	0.598E-02	0.116E-01	0.114E-01	*0.234E-01	*0.230E-01
	2000000.	0.268E-01	0.517E-02	0.151E-01	0.134E-01	*0.294E-01	*0.272E-01
	3000000.	0.238E-01	0.449E-02	0.168E-01	0.143E-01	*0.320E-01	*0.290E-01
	5000000.	0.206E-01	0.374E-02	0.197E-01	0.164E-01	*0.355E-01	*0.328E-01

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4P 7S	200000.	0.649E-01	0.884E-02	*0.910E-02	*0.978E-02		
182.5 Å	500000.	0.479E-01	0.872E-02	*0.140E-01	*0.138E-01		
C=0.38E+20	1000000.	0.389E-01	0.857E-02	*0.181E-01	*0.167E-01		
	2000000.	0.319E-01	0.711E-02	*0.221E-01	*0.196E-01		
	3000000.	0.283E-01	0.612E-02	*0.243E-01	*0.206E-01		
	5000000.	0.243E-01	0.517E-02	*0.294E-01	*0.228E-01		
Ca X 4P 8S	200000.	0.902E-01	0.132E-01				
163.6 Å	500000.	0.673E-01	0.134E-01				
C=0.19E+20	1000000.	0.550E-01	0.127E-01				
	2000000.	0.449E-01	0.105E-01	*0.353E-01	*0.301E-01		
	3000000.	0.398E-01	0.912E-02	*0.401E-01	*0.329E-01		
	5000000.	0.341E-01	0.753E-02	*0.418E-01	*0.361E-01		
Ca X 5P 6S	200000.	0.787	0.560E-01	0.551E-01	0.619E-01	*0.109	*0.111
709.0 Å	500000.	0.570	0.545E-01	0.960E-01	0.915E-01	*0.194	*0.175
C=0.91E+21	1000000.	0.459	0.540E-01	0.124	0.112	*0.243	*0.225
	2000000.	0.376	0.461E-01	0.156	0.131	*0.295	*0.263
	3000000.	0.336	0.399E-01	0.176	0.140	*0.329	*0.284
	5000000.	0.292	0.332E-01	0.200	0.157	*0.355	*0.316
Ca X 5P 7S	200000.	0.408	0.439E-01	*0.480E-01	*0.499E-01		
414.5 Å	500000.	0.300	0.427E-01	*0.726E-01	*0.701E-01		
C=0.19E+21	1000000.	0.244	0.421E-01	*0.937E-01	*0.856E-01		
	2000000.	0.200	0.346E-01	*0.115	*0.996E-01		
	3000000.	0.179	0.297E-01	*0.127	*0.105		
	5000000.	0.155	0.251E-01	*0.152	*0.115		
Ca X 5P 8S	200000.	0.409	0.520E-01				
328.5 Å	500000.	0.304	0.525E-01				
C=0.79E+20	1000000.	0.249	0.497E-01				
	2000000.	0.204	0.408E-01	*0.143	*0.121		
	3000000.	0.181	0.356E-01	*0.162	*0.133		
	5000000.	0.156	0.294E-01	*0.170	*0.144		
Ca X 6P 7S	200000.	4.63	0.336	*0.460	*0.412		
1217.6 Å	500000.	3.43	0.329	*0.658	*0.582		
C=0.17E+22	1000000.	2.80	0.325	*0.828	*0.710		
	2000000.	2.32	0.263	*0.980	*0.818		
	3000000.	2.08	0.225	*1.13	*0.867		
	5000000.	1.82	0.192	*1.35	*0.981		
Ca X 6P 8S	200000.	2.14	0.214				
688.3 Å	500000.	1.60	0.217				
C=0.34E+21	1000000.	1.31	0.206				
	2000000.	1.08	0.168	*0.636	*0.526		
	3000000.	0.966	0.146	*0.705	*0.571		
	5000000.	0.837	0.121	*0.764	*0.614		
Ca X 3P 3D	200000.	0.296E-01	-0.689E-04	0.307E-03	-0.478E-04	0.591E-03	-0.896E-04
417.1 Å	500000.	0.191E-01	-0.874E-04	0.875E-03	-0.124E-03	0.171E-02	-0.244E-03
C=0.31E+22	1000000.	0.140E-01	-0.140E-03	0.142E-02	-0.230E-03	0.280E-02	-0.461E-03
	2000000.	0.106E-01	-0.114E-03	0.194E-02	-0.360E-03	0.386E-02	-0.726E-03
	3000000.	0.910E-02	-0.114E-03	0.211E-02	-0.437E-03	0.419E-02	-0.881E-03
	5000000.	0.767E-02	-0.107E-03	0.233E-02	-0.532E-03	0.461E-02	-0.108E-02
Ca X 3P 4D	200000.	0.600E-02	0.635E-04	0.171E-03	0.117E-03	0.333E-03	0.219E-03
123.5 Å	500000.	0.403E-02	0.648E-04	0.362E-03	0.234E-03	0.714E-03	0.460E-03
C=0.44E+20	1000000.	0.307E-02	0.685E-04	0.532E-03	0.326E-03	0.104E-02	0.657E-03
	2000000.	0.241E-02	0.625E-04	0.662E-03	0.398E-03	0.125E-02	0.804E-03
	3000000.	0.212E-02	0.506E-04	0.760E-03	0.442E-03	0.137E-02	0.892E-03
	5000000.	0.182E-02	0.418E-04	0.899E-03	0.501E-03	0.154E-02	0.101E-02
Ca X 3P 5D	200000.	0.768E-02	0.210E-03	0.489E-03	0.379E-03	*0.958E-03	*0.703E-03
93.3 Å	500000.	0.536E-02	0.173E-03	0.843E-03	0.618E-03	*0.166E-02	*0.120E-02
C=0.13E+20	1000000.	0.421E-02	0.182E-03	0.106E-02	0.753E-03	*0.205E-02	*0.152E-02
	2000000.	0.339E-02	0.142E-03	0.132E-02	0.898E-03	*0.247E-02	*0.182E-02
	3000000.	0.302E-02	0.122E-03	0.154E-02	0.988E-03	0.274E-02	0.201E-02
	5000000.	0.263E-02	0.107E-03	0.176E-02	0.108E-02	0.302E-02	0.220E-02

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3P 6D	200000.	0.120E-01	0.349E-03	*0.119E-02	*0.883E-03		
82.5 Å	500000.	0.862E-02	0.363E-03	*0.176E-02	*0.130E-02		
C=0.59E+19	1000000.	0.692E-02	0.352E-03	0.219E-02	0.158E-02		
	2000000.	0.567E-02	0.278E-03	0.271E-02	0.186E-02	*0.494E-02	*0.373E-02
	3000000.	0.509E-02	0.246E-03	0.296E-02	0.198E-02	*0.525E-02	*0.401E-02
	5000000.	0.447E-02	0.212E-03	0.359E-02	0.227E-02	*0.579E-02	*0.454E-02
Ca X 3P 7D	200000.	0.191E-01	0.562E-03	*0.254E-02	*0.176E-02		
77.1 Å	500000.	0.141E-01	0.668E-03	*0.340E-02	*0.247E-02		
C=0.33E+19	1000000.	0.115E-01	0.590E-03	*0.419E-02	*0.300E-02		
	2000000.	0.950E-02	0.495E-03	*0.511E-02	*0.353E-02		
	3000000.	0.855E-02	0.452E-03	*0.551E-02	*0.370E-02		
	5000000.	0.753E-02	0.355E-03	*0.674E-02	*0.409E-02		
Ca X 3P 8D	200000.	0.296E-01	0.893E-03				
74.0 Å	500000.	0.223E-01	0.104E-02				
C=0.21E+19	1000000.	0.184E-01	0.944E-03				
	2000000.	0.153E-01	0.866E-03				
	3000000.	0.138E-01	0.752E-03	*0.976E-02	*0.647E-02		
	5000000.	0.122E-01	0.571E-03	*0.109E-01	*0.695E-02		
Ca X 4P 4D	200000.	0.731	-0.246E-03	0.271E-01	0.737E-02	0.526E-01	0.138E-01
1151.1 Å	500000.	0.497	-0.145E-03	0.495E-01	0.155E-01	0.974E-01	0.304E-01
C=0.38E+22	1000000.	0.383	-0.123E-03	0.646E-01	0.217E-01	0.127	0.437E-01
	2000000.	0.305	-0.478E-03	0.767E-01	0.272E-01	0.145	0.547E-01
	3000000.	0.270	-0.135E-02	0.854E-01	0.302E-01	0.156	0.611E-01
	5000000.	0.235	-0.158E-02	0.982E-01	0.343E-01	0.169	0.696E-01
Ca X 4P 5D	200000.	0.822E-01	0.163E-02	0.513E-02	0.347E-02	*0.100E-01	*0.643E-02
287.0 Å	500000.	0.576E-01	0.128E-02	0.852E-02	0.567E-02	*0.168E-01	*0.110E-01
C=0.12E+21	1000000.	0.454E-01	0.134E-02	0.106E-01	0.691E-02	*0.204E-01	*0.139E-01
	2000000.	0.368E-01	0.978E-03	0.131E-01	0.829E-02	*0.242E-01	*0.167E-01
	3000000.	0.328E-01	0.794E-03	0.149E-01	0.914E-02	0.266E-01	0.185E-01
	5000000.	0.287E-01	0.688E-03	0.174E-01	0.100E-01	0.294E-01	0.205E-01
Ca X 4P 6D	200000.	0.778E-01	0.196E-02	*0.748E-02	*0.538E-02		
204.4 Å	500000.	0.560E-01	0.205E-02	*0.110E-01	*0.792E-02		
C=0.36E+20	1000000.	0.450E-01	0.197E-02	0.136E-01	0.965E-02		
	2000000.	0.370E-01	0.152E-02	0.168E-01	0.113E-01	*0.307E-01	*0.228E-01
	3000000.	0.332E-01	0.133E-02	0.183E-01	0.120E-01	*0.326E-01	*0.245E-01
	5000000.	0.291E-01	0.114E-02	0.221E-01	0.138E-01	*0.358E-01	*0.276E-01
Ca X 4P 7D	200000.	0.100	0.274E-02	*0.131E-01	*0.897E-02		
174.4 Å	500000.	0.741E-01	0.328E-02	*0.175E-01	*0.126E-01		
C=0.17E+20	1000000.	0.604E-01	0.288E-02	*0.215E-01	*0.153E-01		
	2000000.	0.501E-01	0.239E-02	*0.261E-01	*0.180E-01		
	3000000.	0.451E-01	0.218E-02	*0.283E-01	*0.189E-01		
	5000000.	0.397E-01	0.170E-02	*0.345E-01	*0.209E-01		
Ca X 4P 8D	200000.	0.139	0.402E-02				
159.3 Å	500000.	0.105	0.469E-02				
C=0.97E+19	1000000.	0.866E-01	0.425E-02				
	2000000.	0.721E-01	0.389E-02				
	3000000.	0.651E-01	0.337E-02	*0.452E-01	*0.299E-01		
	5000000.	0.575E-01	0.254E-02	*0.505E-01	*0.321E-01		
Ca X 5P 5D	200000.	7.66	0.618E-01	0.518	0.200	*1.01	*0.371
2398.9 Å	500000.	5.43	0.142E-01	0.771	0.333	*1.52	*0.647
C=0.84E+22	1000000.	4.33	0.221E-01	0.911	0.413	*1.77	*0.832
	2000000.	3.54	-0.164E-03	1.09	0.491	*2.00	*0.995
	3000000.	3.18	-0.623E-02	1.20	0.544	*2.13	*1.10
	5000000.	2.79	-0.415E-02	1.37	0.597	2.25	1.22
Ca X 5P 6D	200000.	0.642	0.114E-01	*0.594E-01	*0.372E-01		
548.3 Å	500000.	0.465	0.108E-01	*0.836E-01	*0.550E-01		
C=0.26E+21	1000000.	0.375	0.104E-01	0.102	0.669E-01		
	2000000.	0.309	0.736E-02	0.124	0.790E-01	*0.226	*0.159
	3000000.	0.278	0.633E-02	0.137	0.838E-01	*0.243	*0.171
	5000000.	0.245	0.545E-02	0.161	0.948E-01	*0.258	*0.190

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 5P 7D	200000.	0.499	0.114E-01	*0.619E-01	*0.410E-01		
375.1 Å	500000.	0.369	0.133E-01	*0.824E-01	*0.577E-01		
C=0.78E+20	1000000.	0.301	0.115E-01	*0.101	*0.704E-01		
	2000000.	0.250	0.940E-02	*0.121	*0.819E-01		
	3000000.	0.225	0.856E-02	*0.133	*0.862E-01		
	5000000.	0.199	0.657E-02	*0.160	*0.953E-01		
Ca X 5P 8D	200000.	0.555	0.145E-01				
311.4 Å	500000.	0.419	0.166E-01				
C=0.37E+20	1000000.	0.345	0.150E-01				
	2000000.	0.288	0.137E-01				
	3000000.	0.260	0.118E-01	*0.174	*0.114		
	5000000.	0.230	0.885E-02	*0.194	*0.123		
Ca X 6P 7D	200000.	3.54	0.456E-01	*0.410	*0.242		
930.4 Å	500000.	2.63	0.590E-01	*0.535	*0.342		
C=0.48E+21	1000000.	2.16	0.488E-01	*0.644	*0.416		
	2000000.	1.80	0.371E-01	*0.757	*0.482		
	3000000.	1.62	0.343E-01	*0.838	*0.507		
	5000000.	1.43	0.258E-01	*1.02	*0.573		
Ca X 6P 8D	200000.	2.37	0.461E-01				
617.3 Å	500000.	1.79	0.552E-01				
C=0.15E+21	1000000.	1.48	0.493E-01				
	2000000.	1.24	0.448E-01				
	3000000.	1.12	0.385E-01	*0.693	*0.440		
	5000000.	0.988	0.283E-01	*0.775	*0.469		
Ca X 3D 4P	200000.	0.166E-01	0.204E-03	0.525E-03	0.110E-03	0.102E-02	0.206E-03
206.9 Å	500000.	0.111E-01	0.208E-03	0.104E-02	0.249E-03	0.206E-02	0.490E-03
C=0.29E+21	1000000.	0.838E-02	0.231E-03	0.143E-02	0.371E-03	0.284E-02	0.746E-03
	2000000.	0.657E-02	0.219E-03	0.164E-02	0.501E-03	0.326E-02	0.101E-02
	3000000.	0.578E-02	0.214E-03	0.178E-02	0.559E-03	0.350E-02	0.113E-02
	5000000.	0.499E-02	0.195E-03	0.197E-02	0.636E-03	0.378E-02	0.128E-02
Ca X 3D 5P	200000.	0.132E-01	0.222E-03	0.871E-03	0.204E-03	*0.170E-02	*0.383E-03
126.6 Å	500000.	0.915E-02	0.288E-03	0.137E-02	0.374E-03	*0.271E-02	*0.734E-03
C=0.52E+20	1000000.	0.717E-02	0.286E-03	0.158E-02	0.513E-03	*0.315E-02	*0.104E-02
	2000000.	0.580E-02	0.273E-03	0.181E-02	0.614E-03	0.356E-02	0.124E-02
	3000000.	0.519E-02	0.252E-03	0.194E-02	0.684E-03	0.376E-02	0.138E-02
	5000000.	0.456E-02	0.218E-03	0.212E-02	0.768E-03	0.397E-02	0.155E-02
Ca X 3D 6P	200000.	0.177E-01	0.470E-03	0.173E-02	0.454E-03		
105.4 Å	500000.	0.127E-01	0.496E-03	0.231E-02	0.742E-03		
C=0.20E+20	1000000.	0.102E-01	0.484E-03	0.264E-02	0.906E-03	*0.521E-02	*0.183E-02
	2000000.	0.842E-02	0.455E-03	0.296E-02	0.108E-02	*0.572E-02	*0.218E-02
	3000000.	0.761E-02	0.410E-03	0.316E-02	0.120E-02	*0.597E-02	*0.243E-02
	5000000.	0.676E-02	0.339E-03	0.341E-02	0.133E-02	*0.619E-02	*0.269E-02
Ca X 4D 5P	200000.	0.198	0.191E-02	0.125E-01	0.113E-02	*0.243E-01	*0.212E-02
454.7 Å	500000.	0.138	0.273E-02	0.192E-01	0.238E-02	*0.380E-01	*0.467E-02
C=0.59E+21	1000000.	0.109	0.260E-02	0.220E-01	0.334E-02	*0.435E-01	*0.672E-02
	2000000.	0.882E-01	0.254E-02	0.254E-01	0.417E-02	0.486E-01	0.842E-02
	3000000.	0.790E-01	0.243E-02	0.274E-01	0.465E-02	0.509E-01	0.941E-02
	5000000.	0.695E-01	0.212E-02	0.302E-01	0.529E-02	0.530E-01	0.107E-01
Ca X 4D 6P	200000.	0.119	0.263E-02	0.112E-01	0.247E-02		
263.8 Å	500000.	0.855E-01	0.278E-02	0.148E-01	0.409E-02		
C=0.13E+21	1000000.	0.689E-01	0.266E-02	0.169E-01	0.507E-02	*0.333E-01	*0.102E-01
	2000000.	0.570E-01	0.253E-02	0.190E-01	0.605E-02	*0.365E-01	*0.122E-01
	3000000.	0.515E-01	0.229E-02	0.204E-01	0.668E-02	*0.375E-01	*0.135E-01
	5000000.	0.457E-01	0.189E-02	0.224E-01	0.731E-02	*0.391E-01	*0.148E-01
Ca X 5D 6P	200000.	1.48	0.128E-01	*0.131	-0.329E-02		
851.5 Å	500000.	1.07	0.176E-01	0.170	-0.709E-02		
C=0.11E+22	1000000.	0.864	0.158E-01	0.194	-0.101E-01	*0.378	-0.203E-01
	2000000.	0.716	0.174E-01	0.219	-0.127E-01	*0.408	-0.257E-01
	3000000.	0.647	0.162E-01	0.236	-0.143E-01	*0.419	-0.288E-01
	5000000.	0.573	0.128E-01	0.262	-0.162E-01	*0.431	-0.327E-01

PERTURBER DENSITY = 1.E+20cm-3

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3S 3P	200000.	0.498	-0.528E-02	0.298E-02	-0.235E-02	0.550E-02	-0.383E-02
563.1 Å	500000.	0.322	-0.502E-02	0.982E-02	-0.648E-02	0.191E-01	-0.122E-01
C=0.56E+23	1000000.	0.238	-0.657E-02	0.179E-01	-0.112E-01	0.354E-01	-0.220E-01
	2000000.	0.180	-0.591E-02	0.264E-01	-0.160E-01	0.523E-01	-0.319E-01
	3000000.	0.155	-0.573E-02	0.303E-01	-0.188E-01	0.603E-01	-0.379E-01
	5000000.	0.130	-0.560E-02	0.351E-01	-0.214E-01	0.684E-01	-0.433E-01
Ca X 3S 4P	200000.	0.481E-01	0.277E-03	0.135E-02	0.158E-03	*0.249E-02	*0.257E-03
111.0 Å	500000.	0.321E-01	0.318E-03	0.278E-02	0.419E-03	*0.544E-02	*0.789E-03
C=0.84E+21	1000000.	0.244E-01	0.287E-03	0.383E-02	0.683E-03	*0.758E-02	*0.134E-02
	2000000.	0.191E-01	0.306E-03	0.441E-02	0.950E-03	*0.874E-02	*0.190E-02
	3000000.	0.168E-01	0.304E-03	0.477E-02	0.106E-02	*0.935E-02	*0.215E-02
	5000000.	0.145E-01	0.266E-03	0.529E-02	0.123E-02	0.101E-01	0.247E-02
Ca X 3S 5P	200000.	0.571E-01	0.658E-03	*0.354E-02	*0.701E-03		
82.8 Å	500000.	0.395E-01	0.100E-02	*0.571E-02	*0.143E-02		
C=0.22E+21	1000000.	0.310E-01	0.954E-03	*0.665E-02	*0.203E-02		
	2000000.	0.250E-01	0.945E-03	*0.761E-02	*0.248E-02		
	3000000.	0.224E-01	0.886E-03	0.817E-02	0.274E-02		
	5000000.	0.196E-01	0.768E-03	0.890E-02	0.310E-02	*0.164E-01	*0.629E-02
Ca X 3S 6P	200000.	*0.857E-01	*0.172E-02				
73.2 Å	500000.	0.614E-01	0.203E-02				
C=0.97E+20	1000000.	0.494E-01	0.197E-02				
	2000000.	0.408E-01	0.191E-02	*0.142E-01	*0.513E-02		
	3000000.	0.369E-01	0.177E-02	*0.151E-01	*0.571E-02		
	5000000.	0.327E-01	0.150E-02	*0.164E-01	*0.632E-02		
Ca X 4S 4P	200000.	10.3	-0.128	0.254	-0.144	*0.469	-0.232
1475.2 Å	500000.	6.98	-0.211	0.533	-0.317	*1.05	-0.589
C=0.15E+24	1000000.	5.39	-0.193	0.765	-0.455	*1.52	-0.881
	2000000.	4.28	-0.184	0.919	-0.564	*1.82	-1.12
	3000000.	3.78	-0.181	1.03	-0.625	*1.99	-1.26
	5000000.	3.26	-0.156	1.20	-0.711	*2.22	-1.43
Ca X 4S 5P	200000.	0.651	0.105E-02	*0.365E-01	*0.208E-02		
267.0 Å	500000.	0.453	0.164E-02	*0.585E-01	*0.506E-02		
C=0.23E+22	1000000.	0.357	0.192E-02	*0.677E-01	*0.760E-02		
	2000000.	0.290	0.202E-02	0.771E-01	0.100E-01		
	3000000.	0.259	0.153E-02	0.830E-01	0.112E-01		
	5000000.	0.227	0.133E-02	0.906E-01	0.128E-01	*0.164	*0.258E-01
Ca X 4S 6P	200000.	*0.590	*0.837E-02				
187.4 Å	500000.	0.424	0.897E-02				
C=0.64E+21	1000000.	0.341	0.894E-02				
	2000000.	0.282	0.870E-02	*0.921E-01	*0.293E-01		
	3000000.	0.255	0.785E-02	*0.972E-01	*0.323E-01		
	5000000.	0.226	0.653E-02	*0.106	*0.360E-01		
Ca X 5S 6P	200000.	*5.14	-0.117E-02				
521.4 Å	500000.	3.71	-0.958E-02				
C=0.49E+22	1000000.	3.00	-0.130E-01	*0.622	-0.438E-01		
	2000000.	2.48	-0.122E-01	*0.700	-0.555E-01		
	3000000.	2.24	-0.101E-01	*0.745	-0.617E-01		
	5000000.	1.98	-0.104E-01	*0.818	-0.703E-01		
Ca X 3P 4S	200000.	0.561E-01	0.228E-02	0.702E-03	0.195E-02	*0.135E-02	*0.312E-02
152.6 Å	500000.	0.380E-01	0.323E-02	0.282E-02	0.411E-02	*0.561E-02	*0.760E-02
C=0.16E+22	1000000.	0.292E-01	0.310E-02	0.495E-02	0.590E-02	0.989E-02	0.114E-01
	2000000.	0.230E-01	0.298E-02	0.712E-02	0.718E-02	0.142E-01	0.143E-01
	3000000.	0.202E-01	0.293E-02	0.835E-02	0.799E-02	0.164E-01	0.161E-01
	5000000.	0.172E-01	0.259E-02	0.102E-01	0.913E-02	0.192E-01	0.183E-01
Ca X 3P 5S	200000.	0.461E-01	0.345E-02	*0.235E-02	*0.371E-02		
100.3 Å	500000.	0.327E-01	0.433E-02	*0.570E-02	*0.673E-02		
C=0.33E+21	1000000.	0.260E-01	0.438E-02	0.838E-02	0.855E-02		
	2000000.	0.210E-01	0.423E-02	0.108E-01	0.105E-01		
	3000000.	0.186E-01	0.389E-02	0.130E-01	0.114E-01		
	5000000.	0.160E-01	0.337E-02	0.151E-01	0.126E-01		

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3P 6S	200000.	0.661E-01	0.645E-02				
85.4 Å	500000.	0.486E-01	0.751E-02				
C=0.13E+21	1000000.	0.393E-01	0.776E-02				
	2000000.	0.321E-01	0.697E-02	*0.221E-01	*0.197E-01		
	3000000.	0.285E-01	0.645E-02	*0.243E-01	*0.210E-01		
	5000000.	0.245E-01	0.570E-02	*0.289E-01	*0.241E-01		
Ca X 3P 7S	200000.	*0.106	*0.926E-02				
78.7 Å	500000.	0.788E-01	0.119E-01				
C=0.70E+20	1000000.	0.644E-01	0.126E-01				
	2000000.	0.529E-01	0.110E-01				
	3000000.	0.470E-01	0.105E-01				
	5000000.	0.403E-01	0.970E-02				
Ca X 3P 8S	200000.	*0.169	*0.974E-02				
75.0 Å	500000.	0.128	0.174E-01				
C=0.41E+20	1000000.	0.105	0.180E-01				
	2000000.	0.865E-01	0.159E-01				
	3000000.	0.769E-01	0.164E-01				
	5000000.	0.658E-01	0.156E-01				
Ca X 4P 5S	200000.	0.914	0.403E-01	*0.373E-01	*0.476E-01		
364.8 Å	500000.	0.641	0.517E-01	*0.823E-01	*0.865E-01		
C=0.43E+22	1000000.	0.506	0.521E-01	*0.116	*0.110		
	2000000.	0.407	0.502E-01	0.149	0.135		
	3000000.	0.361	0.458E-01	0.176	0.149		
	5000000.	0.312	0.394E-01	0.208	0.163		
Ca X 4P 6S	200000.	0.565	0.420E-01				
223.3 Å	500000.	0.409	0.492E-01				
C=0.90E+21	1000000.	0.329	0.508E-01				
	2000000.	0.268	0.455E-01	*0.151	*0.133		
	3000000.	0.238	0.420E-01	*0.168	*0.142		
	5000000.	0.206	0.370E-01	*0.197	*0.164		
Ca X 4P 7S	200000.	*0.642	*0.483E-01				
182.5 Å	500000.	0.475	0.625E-01				
C=0.38E+21	1000000.	0.387	0.664E-01				
	2000000.	0.317	0.577E-01				
	3000000.	0.281	0.549E-01				
	5000000.	0.242	0.509E-01				
Ca X 4P 8S	200000.	*0.862	*0.452E-01				
163.6 Å	500000.	*0.650	*0.816E-01				
C=0.19E+21	1000000.	0.534	0.844E-01				
	2000000.	0.438	0.744E-01				
	3000000.	0.389	0.769E-01				
	5000000.	0.334	0.734E-01				
Ca X 5P 6S	200000.	*7.87	*0.385				
709.0 Å	500000.	5.69	0.435				
C=0.91E+22	1000000.	4.58	0.454				
	2000000.	3.75	0.402	*1.56	*1.31		
	3000000.	3.35	0.371	*1.76	*1.39		
	5000000.	2.92	0.328	*2.00	*1.57		
Ca X 5P 7S	200000.	*4.04	*0.235				
414.5 Å	500000.	2.98	0.301				
C=0.19E+22	1000000.	2.43	0.323				
	2000000.	1.99	0.278				
	3000000.	1.78	0.265				
	5000000.	1.54	0.247				
Ca X 5P 8S	200000.	*3.93	*0.172				
328.5 Å	500000.	*2.95	*0.315				
C=0.79E+21	1000000.	2.42	0.327				
	2000000.	1.99	0.288				
	3000000.	1.77	0.299				
	5000000.	1.53	0.286				

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 6P 8S	200000.						
688.3 Å	500000.	*15.6	*1.27				
C=0.34E+22	1000000.	12.8	1.33				
	2000000.	10.6	1.16				
	3000000.	9.50	1.22				
	5000000.	8.25	1.18				
Ca X 3P 3D	200000.	0.296	-0.573E-03	0.302E-02	-0.418E-03	0.558E-02	-0.682E-03
417.1 Å	500000.	0.191	-0.833E-03	0.873E-02	-0.120E-02	0.170E-01	-0.227E-02
C=0.31E+23	1000000.	0.140	-0.137E-02	0.142E-01	-0.228E-02	0.280E-01	-0.447E-02
	2000000.	0.106	-0.111E-02	0.194E-01	-0.360E-02	0.386E-01	-0.720E-02
	3000000.	0.910E-01	-0.113E-02	0.211E-01	-0.437E-02	0.419E-01	-0.879E-02
	5000000.	0.767E-01	-0.107E-02	0.233E-01	-0.532E-02	0.461E-01	-0.107E-01
Ca X 3P 4D	200000.	0.600E-01	0.433E-03	0.169E-02	0.101E-02	*0.312E-02	*0.163E-02
123.5 Å	500000.	0.403E-01	0.537E-03	0.361E-02	0.223E-02	*0.706E-02	*0.415E-02
C=0.44E+21	1000000.	0.307E-01	0.590E-03	0.531E-02	0.320E-02	*0.104E-01	*0.620E-02
	2000000.	0.241E-01	0.558E-03	0.662E-02	0.397E-02	*0.125E-01	*0.788E-02
	3000000.	0.212E-01	0.475E-03	0.760E-02	0.441E-02	*0.137E-01	*0.889E-02
	5000000.	0.182E-01	0.414E-03	0.899E-02	0.501E-02	*0.154E-01	*0.101E-01
Ca X 3P 5D	200000.	0.767E-01	0.126E-02	*0.478E-02	*0.317E-02		
93.3 Å	500000.	0.535E-01	0.121E-02	*0.839E-02	*0.575E-02		
C=0.13E+21	1000000.	0.421E-01	0.142E-02	*0.106E-01	*0.731E-02		
	2000000.	0.339E-01	0.115E-02	*0.132E-01	*0.893E-02		
	3000000.	0.302E-01	0.109E-02	*0.154E-01	*0.985E-02		
	5000000.	0.263E-01	0.105E-02	*0.176E-01	*0.108E-01		
Ca X 3P 6D	200000.	*0.119	*0.757E-03				
82.5 Å	500000.	0.855E-01	0.200E-02				
C=0.59E+20	1000000.	0.688E-01	0.220E-02				
	2000000.	0.564E-01	0.185E-02				
	3000000.	0.506E-01	0.202E-02				
	5000000.	0.444E-01	0.206E-02				
Ca X 3P 7D	200000.	*0.184	-0.104E-02				
77.1 Å	500000.	0.137	0.269E-02				
C=0.33E+20	1000000.	0.112	0.253E-02				
	2000000.	0.932E-01	0.251E-02				
	3000000.	0.841E-01	0.330E-02				
	5000000.	0.742E-01	0.339E-02				
Ca X 3P 8D	200000.						
74.0 Å	500000.	*0.210	*0.250E-02				
C=0.21E+20	1000000.	0.175	0.255E-02				
	2000000.	0.147	0.346E-02				
	3000000.	0.133	0.477E-02				
	5000000.	0.118	0.529E-02				
Ca X 4P 4D	200000.	7.31	-0.141E-01	0.265	0.643E-01	*0.486	*0.104
1151.1 Å	500000.	4.97	-0.842E-02	0.493	0.148	*0.960	*0.276
C=0.38E+23	1000000.	3.83	-0.707E-02	0.645	0.214	*1.26	*0.415
	2000000.	3.05	-0.902E-02	0.767	0.271	*1.45	*0.538
	3000000.	2.70	-0.153E-01	0.854	0.301	*1.56	*0.609
	5000000.	2.35	-0.161E-01	0.982	0.343	*1.69	*0.695
Ca X 4P 5D	200000.	0.821	0.872E-02	*0.499E-01	*0.290E-01		
287.0 Å	500000.	0.575	0.797E-02	*0.848E-01	*0.528E-01		
C=0.12E+22	1000000.	0.454	0.980E-02	*0.106	*0.672E-01		
	2000000.	0.368	0.726E-02	*0.131	*0.825E-01		
	3000000.	0.328	0.678E-02	*0.149	*0.911E-01		
	5000000.	0.287	0.672E-02	*0.174	*0.100		
Ca X 4P 6D	200000.	*0.771	*0.301E-02				
204.4 Å	500000.	0.556	0.106E-01				
C=0.36E+21	1000000.	0.448	0.117E-01				
	2000000.	0.368	0.951E-02				
	3000000.	0.330	0.106E-01				
	5000000.	0.290	0.110E-01				

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4P 7D	200000.	*0.972	-0.652E-02				
174.4 Å	500000.	*0.722	*0.125E-01				
C=0.17E+21	1000000.	0.591	0.116E-01				
	2000000.	0.491	0.115E-01				
	3000000.	0.443	0.156E-01				
	5000000.	0.391	0.161E-01				
Ca X 4P 8D	200000.						
159.3 Å	500000.	*0.991	*0.105E-01				
C=0.97E+20	1000000.	0.825	0.107E-01				
	2000000.	0.693	0.149E-01				
	3000000.	0.628	0.210E-01				
	5000000.	0.556	0.235E-01				
Ca X 5P 6D	200000.	*6.37	-0.376E-03				
548.3 Å	500000.	4.62	0.399E-01				
C=0.26E+22	1000000.	3.73	0.491E-01				
	2000000.	3.08	0.345E-01				
	3000000.	2.77	0.451E-01				
	5000000.	2.44	0.521E-01				
Ca X 5P 7D	200000.	*4.84	-0.405E-01				
375.1 Å	500000.	*3.60	*0.409E-01				
C=0.78E+21	1000000.	2.95	0.373E-01				
	2000000.	2.46	0.374E-01				
	3000000.	2.22	0.574E-01				
	5000000.	1.96	0.619E-01				
Ca X 5P 8D	200000.						
311.4 Å	500000.	*3.96	*0.285E-01				
C=0.37E+21	1000000.	*3.30	*0.297E-01				
	2000000.	2.77	0.460E-01				
	3000000.	2.51	0.702E-01				
	5000000.	2.23	0.811E-01				
Ca X 6P 8D	200000.						
617.3 Å	500000.	*17.0	*0.236E-01				
C=0.15E+22	1000000.	*14.2	*0.300E-01				
	2000000.	11.9	0.972E-01				
	3000000.	10.8	0.199				
	5000000.	9.60	0.255				
Ca X 3D 4P	200000.	0.166	0.182E-02	0.516E-02	0.959E-03	*0.948E-02	*0.156E-02
206.9 Å	500000.	0.111	0.199E-02	0.104E-01	0.240E-02	*0.204E-01	*0.449E-02
C=0.29E+22	1000000.	0.838E-01	0.222E-02	0.143E-01	0.366E-02	*0.283E-01	*0.714E-02
	2000000.	0.657E-01	0.213E-02	0.164E-01	0.500E-02	*0.326E-01	*0.998E-02
	3000000.	0.578E-01	0.211E-02	0.178E-01	0.558E-02	*0.350E-01	*0.112E-01
	5000000.	0.499E-01	0.194E-02	0.197E-01	0.636E-02	0.378E-01	0.128E-01
Ca X 3D 5P	200000.	0.132	0.186E-02	*0.847E-02	*0.176E-02		
126.6 Å	500000.	0.915E-01	0.267E-02	*0.136E-01	*0.355E-02		
C=0.52E+21	1000000.	0.717E-01	0.269E-02	*0.158E-01	*0.504E-02		
	2000000.	0.580E-01	0.261E-02	*0.181E-01	*0.612E-02		
	3000000.	0.519E-01	0.246E-02	0.194E-01	0.683E-02		
	5000000.	0.456E-01	0.218E-02	0.212E-01	0.768E-02	*0.397E-01	*0.154E-01
Ca X 3D 6P	200000.	0.177	0.379E-02				
105.4 Å	500000.	0.127	0.444E-02				
C=0.20E+21	1000000.	0.102	0.439E-02				
	2000000.	0.842E-01	0.424E-02	*0.296E-01	*0.108E-01		
	3000000.	0.761E-01	0.395E-02	*0.315E-01	*0.120E-01		
	5000000.	0.676E-01	0.337E-02	*0.341E-01	*0.133E-01		
Ca X 4D 5P	200000.	1.98	0.174E-01	*0.121	*0.984E-02		
454.7 Å	500000.	1.38	0.261E-01	*0.191	*0.228E-01		
C=0.59E+22	1000000.	1.09	0.251E-01	*0.220	*0.329E-01		
	2000000.	0.882	0.248E-01	*0.254	*0.416E-01		
	3000000.	0.790	0.240E-01	0.274	0.464E-01		
	5000000.	0.695	0.212E-01	0.302	0.529E-01	*0.530	*0.107

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4D 6P	200000.	*1.19	*0.215E-01				
263.8 Å	500000.	0.855	0.250E-01				
C=0.13E+22	1000000.	0.689	0.243E-01				
	2000000.	0.570	0.236E-01	*0.190	*0.602E-01		
	3000000.	0.515	0.221E-01	*0.204	*0.666E-01		
	5000000.	0.457	0.188E-01	*0.224	*0.731E-01		
Ca X 5D 6P	200000.	*14.8	*0.139				
851.5 Å	500000.	10.7	0.185				
C=0.11E+23	1000000.	8.63	0.163				
	2000000.	7.15	0.177	*2.19	-0.127		
	3000000.	6.46	0.163	*2.36	-0.143		
	5000000.	5.73	0.128	*2.62	-0.162		
PERTURBER DENSITY = 1.E+21cm-3							
Ca X 3S 3P	200000.	4.98	-0.390E-01	0.252E-01	-0.147E-01	*0.354E-01	-0.153E-01
563.1 Å	500000.	3.22	-0.421E-01	0.970E-01	-0.574E-01	*0.183	-0.973E-01
C=0.56E+24	1000000.	2.38	-0.598E-01	0.179	-0.106	*0.350	-0.198
	2000000.	1.80	-0.548E-01	0.264	-0.157	*0.521	-0.304
	3000000.	1.55	-0.543E-01	0.303	-0.187	0.602	-0.370
	5000000.	1.30	-0.543E-01	0.351	-0.214	0.684	-0.431
Ca X 3S 4P	200000.	*0.480	*0.179E-02	*0.109E-01	*0.988E-03		
111.0 Å	500000.	0.321	0.263E-02	*0.271E-01	*0.370E-02		
C=0.84E+22	1000000.	0.244	0.251E-02	*0.380E-01	*0.641E-02		
	2000000.	0.191	0.275E-02	*0.440E-01	*0.932E-02		
	3000000.	0.168	0.284E-02	*0.477E-01	*0.106E-01		
	5000000.	0.145	0.255E-02	*0.529E-01	*0.122E-01		
Ca X 3S 5P	200000.	*0.567	*0.158E-02				
82.8 Å	500000.	*0.393	*0.709E-02				
C=0.22E+22	1000000.	0.308	0.761E-02				
	2000000.	0.249	0.805E-02				
	3000000.	0.223	0.782E-02				
	5000000.	0.196	0.714E-02				
Ca X 3S 6P	200000.						
73.2 Å	500000.	*0.595	*0.106E-01				
C=0.97E+21	1000000.	*0.481	*0.131E-01				
	2000000.	0.399	0.143E-01				
	3000000.	0.362	0.142E-01				
	5000000.	0.322	0.131E-01				
Ca X 4S 5P	200000.	*6.47	-0.406E-02				
267.0 Å	500000.	*4.51	*0.704E-02				
C=0.23E+23	1000000.	3.56	0.135E-01				
	2000000.	2.89	0.162E-01				
	3000000.	2.58	0.124E-01				
	5000000.	2.27	0.119E-01				
Ca X 4S 6P	200000.						
187.4 Å	500000.	*4.11	*0.367E-01				
C=0.64E+22	1000000.	*3.33	*0.538E-01				
	2000000.	2.76	0.605E-01				
	3000000.	2.50	0.590E-01				
	5000000.	2.23	0.553E-01				
Ca X 3P 4S	200000.	0.561	0.961E-02	*0.658E-02	*0.116E-01		
152.6 Å	500000.	0.380	0.249E-01	*0.281E-01	*0.345E-01		
C=0.16E+23	1000000.	0.292	0.258E-01	*0.498E-01	*0.534E-01		
	2000000.	0.230	0.261E-01	*0.711E-01	*0.695E-01		
	3000000.	0.202	0.265E-01	*0.835E-01	*0.795E-01		
	5000000.	0.172	0.244E-01	0.102	0.909E-01		
Ca X 3P 5S	200000.	*0.452	-0.560E-03				
100.3 Å	500000.	*0.323	*0.239E-01				
C=0.33E+22	1000000.	0.257	0.302E-01				
	2000000.	0.208	0.326E-01				
	3000000.	0.184	0.316E-01				
	5000000.	0.159	0.299E-01				

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3P 6S	200000.	*0.589	-0.299E-01				
85.4 Å	500000.	*0.451	*0.218E-01				
C=0.13E+22	1000000.	0.370	0.410E-01				
	2000000.	0.305	0.428E-01				
	3000000.	0.272	0.431E-01				
	5000000.	0.235	0.455E-01				
Ca X 3P 7S	200000.						
78.7 Å	500000.	*0.651	*0.586E-02				
C=0.70E+21	1000000.	*0.552	*0.466E-01				
	2000000.	0.465	0.509E-01				
	3000000.	0.418	0.551E-01				
	5000000.	0.363	0.679E-01				
Ca X 3P 8S	200000.						
75.0 Å	500000.						
C=0.41E+21	1000000.	*0.796	*0.367E-01				
	2000000.	*0.687	*0.489E-01				
	3000000.	0.624	0.673E-01				
	5000000.	0.546	0.938E-01				
Ca X 4P 5S	200000.	*9.03	-0.449E-01				
364.8 Å	500000.	6.35	0.270				
C=0.43E+23	1000000.	5.02	0.347				
	2000000.	4.05	0.378				
	3000000.	3.59	0.364				
	5000000.	3.11	0.345				
Ca X 4P 6S	200000.						
223.3 Å	500000.	*3.86	*0.131				
C=0.90E+22	1000000.	3.13	0.260				
	2000000.	2.57	0.273				
	3000000.	2.29	0.275				
	5000000.	1.99	0.292				
Ca X 4P 7S	200000.						
182.5 Å	500000.	*4.01	*0.192E-01				
C=0.38E+22	1000000.	*3.37	*0.237				
	2000000.	2.82	0.260				
	3000000.	2.54	0.283				
	5000000.	2.21	0.353				
Ca X 4P 8S	200000.						
163.6 Å	500000.						
C=0.19E+22	1000000.	*4.12	*0.164				
	2000000.	*3.53	*0.222				
	3000000.	3.20	0.310				
	5000000.	2.81	0.437				
Ca X 3P 3D	200000.	2.96	-0.384E-02	0.253E-01	-0.263E-02	*0.351E-01	-0.272E-02
417.1 Å	500000.	1.91	-0.683E-02	0.861E-01	-0.107E-01	*0.162	-0.183E-01
C=0.31E+24	1000000.	1.40	-0.128E-01	0.141	-0.217E-01	*0.276	-0.408E-01
	2000000.	1.06	-0.104E-01	0.194	-0.355E-01	*0.385	-0.694E-01
	3000000.	0.910	-0.107E-01	0.211	-0.436E-01	*0.418	-0.865E-01
	5000000.	0.767	-0.104E-01	0.233	-0.531E-01	0.461	-0.107
Ca X 3P 4D	200000.	*0.597	-0.311E-02	*0.137E-01	*0.613E-02		
123.5 Å	500000.	0.402	0.124E-02	*0.353E-01	*0.190E-01		
C=0.44E+22	1000000.	0.306	0.302E-02	*0.529E-01	*0.292E-01		
	2000000.	0.240	0.353E-02	*0.661E-01	*0.385E-01		
	3000000.	0.211	0.316E-02	*0.760E-01	*0.439E-01		
	5000000.	0.182	0.331E-02	*0.899E-01	*0.499E-01		
Ca X 3P 5D	200000.	*0.732	-0.115E-01				
93.3 Å	500000.	*0.518	-0.192E-02				
C=0.13E+22	1000000.	0.409	0.448E-02				
	2000000.	0.331	0.414E-02				
	3000000.	0.295	0.480E-02				
	5000000.	0.258	0.709E-02				

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 3P 6D	200000.						
82.5 Å	500000.	*0.777	-0.849E-02				
C=0.59E+21	1000000.	*0.636	0.137E-02				
	2000000.	0.528	0.272E-02				
	3000000.	0.477	0.605E-02				
	5000000.	0.422	0.112E-01				
Ca X 3P 7D	200000.						
77.1 Å	500000.						
C=0.33E+21	1000000.	*0.968	-0.425E-02				
	2000000.	*0.825	*0.953E-03				
	3000000.	*0.754	*0.884E-02				
	5000000.	0.675	0.150E-01				
Ca X 3P 8D	200000.						
74.0 Å	500000.						
C=0.21E+21	1000000.						
	2000000.	*1.23	*0.310E-02				
	3000000.	*1.14	*0.128E-01				
	5000000.	*1.03	*0.210E-01				
Ca X 4P 5D	200000.						
287.0 Å	500000.	*5.59	-0.467E-01				
C=0.12E+23	1000000.	4.43	0.101E-01				
	2000000.	3.60	0.651E-02				
	3000000.	3.22	0.123E-01				
	5000000.	2.82	0.359E-01				
Ca X 4P 6D	200000.						
204.4 Å	500000.	*5.08	-0.666E-01				
C=0.36E+22	1000000.	*4.16	-0.800E-02				
	2000000.	3.46	0.163E-03				
	3000000.	3.12	0.203E-01				
	5000000.	2.76	0.531E-01				
Ca X 4P 7D	200000.						
174.4 Å	500000.						
C=0.17E+22	1000000.	*5.12	-0.337E-01				
	2000000.	*4.37	-0.718E-02				
	3000000.	*3.99	*0.329E-01				
	5000000.	3.57	0.651E-01				
Ca X 4P 8D	200000.						
159.3 Å	500000.						
C=0.97E+21	1000000.						
	2000000.	*5.81	*0.429E-02				
	3000000.	*5.37	*0.492E-01				
	5000000.	*4.86	*0.874E-01				
Ca X 3D 4P	200000.	*1.66	*0.125E-01	*0.412E-01	*0.597E-02		
206.9 Å	500000.	1.10	0.165E-01	*0.101	*0.209E-01		
C=0.29E+23	1000000.	0.838	0.199E-01	*0.142	*0.341E-01		
	2000000.	0.656	0.195E-01	*0.164	*0.490E-01		
	3000000.	0.577	0.199E-01	*0.178	*0.556E-01		
	5000000.	0.499	0.188E-01	*0.197	*0.634E-01		
Ca X 3D 5P	200000.	*1.31	*0.608E-02				
126.6 Å	500000.	*0.911	*0.193E-01				
C=0.52E+22	1000000.	0.715	0.220E-01				
	2000000.	0.578	0.225E-01				
	3000000.	0.517	0.220E-01				
	5000000.	0.455	0.204E-01				
Ca X 3D 6P	200000.						
105.4 Å	500000.	*1.23	*0.240E-01				
C=0.20E+22	1000000.	*0.993	*0.301E-01				
	2000000.	0.824	0.322E-01				
	3000000.	0.747	0.320E-01				
	5000000.	0.665	0.298E-01				

PERTURBERS ARE:		ELECTRONS		PROTONS		He III	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
Ca X 4D 5P	200000.						
454.7 Å	500000.	*13.7	*0.225				
C=0.59E+23	1000000.	10.8	0.227				
	2000000.	8.79	0.231				
	3000000.	7.87	0.228				
	5000000.	6.92	0.206				
Ca X 4D 6P	200000.						
263.8 Å	500000.	*8.29	*0.142				
C=0.13E+23	1000000.	*6.72	*0.170				
	2000000.	5.58	0.182				
	3000000.	5.06	0.182				
	5000000.	4.50	0.167				
PERTURBER DENSITY = 1.E+22cm-3							
Ca X 3S 5P	200000.						
82.8 Å	500000.						
C=0.22E+23	1000000.	*2.84	*0.972E-02				
	2000000.	*2.33	*0.361E-01				
	3000000.	*2.10	*0.393E-01				
	5000000.	1.86	0.386E-01				
Ca X 3P 4S	200000.						
152.6 Å	500000.	*3.65	-0.218E-01				
C=0.16E+24	1000000.	2.84	0.831E-01				
	2000000.	2.24	0.143				
	3000000.	1.97	0.162				
	5000000.	1.69	0.157				
Ca X 3P 5S	200000.						
100.3 Å	500000.	*2.53	-0.235				
C=0.33E+23	1000000.	*2.15	-0.150E-01				
	2000000.	1.80	0.105				
	3000000.	1.62	0.122				
	5000000.	1.41	0.123				
Ca X 3P 6S	200000.						
85.4 Å	500000.						
C=0.13E+23	1000000.	*2.40	-0.127				
	2000000.	*2.18	*0.464E-01				
	3000000.	*2.02	*0.860E-01				
	5000000.	1.81	0.113				
Ca X 3P 7S	200000.						
78.7 Å	500000.						
C=0.70E+22	1000000.	*2.66	-0.263				
	2000000.	*2.70	-0.325E-01				
	3000000.	*2.61	*0.248E-01				
	5000000.	*2.43	*0.111				

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. Stark broadening parameters for densities lover than tabulated, are linear with perturber density. When the impact approximation is not valid, the ion broadening contribution may be estimated by using quasistatic approach (Sahal−Bréchot 1991 or Griem 1974). In the region between where neither of these two approximations is valid, a unified type theory should be used. For example in Barnard et al. (1974), a simple analytical formulas for such a case are given. The accuracy of the results obtained decreases when broadening by ion interactions becomes important.

The discussion of obtained results will be published in Dimitrijević and Sahal−Bréchot, 1997.

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ТАБЕЛЕ ПАРАМЕТАРА ШТАРКОВОГ ШИРЕЊА СПЕКТРАЛНИХ ЛИНИЈА Ca IX И Ca X

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Претходно саопштење

Користећи семикласичан прилаз, израчунате су ширине и помераји спектралних линија, проузроковани сударима са електронима, протонима и двоструко наелектрисаним јонима хелијума, за 4 мултиплета Ca IX и 48 мултиплета Ca X. Резултати су дати у функцији температуре и концентрације пертурбера.