Bull. Astron. Belgrade № 151 (1995), 101 – 114

UDC 52–355.3
Preliminary report

STARK BROADENING PARAMETER TABLES FOR Mg II

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(Received: January 10, 1995)

SUMMARY: Using a semiclassical approach, we have calculated electron–, proton–, and ionised helium–impact line widths and shifts for 52 Mg II multiplets as a function of temperature and perturber density.

1. INTRODUCTION

Due to the cosmical abundance of magnesium and its ionization potential value, Mg II lines are present in solar and stellar spectra and the corresponding Stark broadening data are of interest for their analysis. In order to provide to astrophysicists the needed Stark broadening data, we have calculated within the semiclassical-perturbation formalism (Sahal–Bréchot, 1969ab) electron-, proton-, and ionized helium-impact line widths and shifts for 52 Mg II multiplets.

2. RESULTS AND DISCUSSION

Analysis of obtained results and all details of calculations as well as the comparison with availlable experimental data will be published elsewhere (Dimitrijević and Sahal–Bréchot, 1995). Here, we present only tables of Stark broadening parameters for astrophysical and laboratory plasma diagnostic purposes. Our results for 52 Mg II multiplets are shown in Table 1, for perturber densities of 10^{16}–10^{19} cm^{-3} and temperatures T = 5,000 – 150,000 K. We also specify a parameter c (Dimitrijević and

Table 1. This table shows electron-, proton-, and He II- impact broadening parameters for Mg II, for perturber densities of 10^{16} – 10^{19} cm^{-3} and temperatures from 5,000 up to 150,000 K. Transitions and averaged wavelengths for the multiplet (in Å) are also given. By using c [see Eq. (5) in 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 = 1xE+16cm-3

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 3s-3p	5000.	0.173E-01	-0.312E-04	0.263E-03	-0.641E-05	0.388E-03	-0.641E-05
2798.7 A	10000.	0.126E-01	-0.382E-04	0.475E-03	-0.133E-04	0.592E-03	-0.132E-04
C= 0.27E+20	20000.	0.911E-02	-0.443E-04	0.679E-03	-0.256E-04	0.773E-03	-0.244E-04
	50000.	0.651E-02	-0.493E-04	0.846E-03	-0.487E-04	0.906E-03	-0.421E-04
	100000.	0.559E-02	-0.541E-04	0.944E-03	-0.670E-04	0.990E-03	-0.564E-04
	150000.	0.525E-02	-0.513E-04	0.988E-03	-0.751E-04	0.101E-02	-0.628E-04
Mg II 3s-4p	5000.	0.726E-02	0.627E-03	0.565E-03	0.317E-04	0.691E-03	0.304E-04
1240.1 A	10000.	0.561E-02	0.391E-03	0.751E-03	0.563E-04	0.812E-03	0.509E-04
C= 0.14E+19	20000.	0.460E-02	0.286E-03	0.851E-03	0.818E-04	0.910E-03	0.713E-04
	50000.	0.416E-02	0.249E-03	0.968E-03	0.112E-03	0.993E-03	0.927E-04
	100000.	0.410E-02	0.204E-03	0.101E-02	0.134E-03	0.103E-02	0.110E-03
	150000.	0.405E-02	0.179E-03	0.103E-02	0.148E-03	0.103E-02	0.120E-03
Mg II 3s-5p	5000.	0.103E-01	0.868E-03	0.156E-02-0.941E-04*		0.167E-02	-0.851E-04
1026.0 A	10000.	0.861E-02	0.661E-03	0.178E-02	-0.143E-03	0.190E-02	-0.125E-03
C= 0.44E+18	20000.	0.795E-02	0.446E-03	0.198E-02	-0.188E-03	0.204E-02	-0.157E-03
	50000.	0.822E-02	0.336E-03	0.210E-02	-0.240E-03	0.214E-02	-0.198E-03
	100000.	0.860E-02	0.226E-03	0.216E-02	-0.282E-03	0.218E-02	-0.228E-03
	150000.	0.867E-02	0.220E-03	0.219E-02	-0.305E-03	0.220E-02	-0.248E-03
Mg II 3s-6p	5000.	0.165E-01	-0.839E-03*	0.345E-02	-0.564E-03		
946.7 A	10000.	0.151E-01	-0.642E-03*	0.392E-02	-0.747E-03*	0.406E-02	-0.613E-03
C= 0.20E+18	20000.	0.153E-01	-0.456E-03	0.417E-02	-0.916E-03*	0.424E-02	-0.753E-03
	50000.	0.171E-01	-0.206E-03	0.436E-02	-0.113E-02*	0.439E-02	-0.916E-03
	100000.	0.184E-01	-0.137E-03	0.441E-02	-0.131E-02	0.443E-02	-0.103E-02
	150000.	0.186E-01	-0.832E-04	0.442E-02	-0.138E-02	0.444E-02	-0.113E-02
Mg II 3s-7p	5000.	0.282E-01	-0.554E-02				
907.4 A	10000.	0.271E-01	-0.426E-02*	0.764E-02	-0.204E-02		
C= 0.11E+18	20000.	0.289E-01	-0.273E-02*	0.803E-02	-0.251E-02		
	50000.	0.338E-01	-0.215E-02*	0.847E-02	-0.298E-02*	0.834E-02	-0.246E-02
	100000.	0.365E-01	-0.127E-02	0.888E-02	-0.345E-02*	0.836E-02	-0.289E-02
	150000.	0.369E-01	-0.106E-02	0.879E-02	-0.365E-02*	0.807E-02	-0.295E-02
Mg II 4s-4p	5000,	0.514	-0.124	0.318E-01	-0.904E-02	0.386E-01	-0.804E-02
9229.4 A	10000.	0.393	-0.917E-01	0.426E-01	-0.135E-01	0.456E-01	-0.117E-01
C= 0.78E+20	20000.	0.327	-0.670E-01	0.487E-01	-0.174E-01	0.514E-01	-0.145E-01
	50000.	0.313	-0.501E-01	0.564E-01	-0.222E-01	0.563E-01	-0.183E-01
	100000.	0.318	-0.397E-01	0.592E-01	-0.261E-01	0.596E-01	-0.210E-01
	150000.	0.318	-0.353E-01	0.626E-01	-0.278E-01	0.611E-01	-0.227E-01
Mg II 4s-5p	5000.	0.136	-0.101E-01	0.194E-01	-0.242E-02*	0.208E-01	-0.207E-02
3615.4 A	10000.	0.114	-0.806E-02	0.222E-01	-0.352E-02	0.236E-01	-0.295E-02
C= 0.54E+19	20000.	0.107	-0.696E-02	0.247E-01	-0.435E-02	0.254E-01	-0.359E-02
	50000.	0.113	-0.566E-02	0.262E-01	-0.554E-02	0.267E-01	-0.452E-02
	100000.	0.120	-0.521E-02	0.272E-01	-0.635E-02	0.270E-01	-0.509E-02
	150000.	0.121	-0.418E-02	0.269E-01	-0.678E-02	0.271E-01	-0.560E-02
Mg II 4s-6p	5000.	0.150	-0.996E-02*	0.301E-01	-0.534E-02		
2791.6 A	10000.	0.136	-0.125E-01*	0.342E-01	-0.700E-02*	0.353E-01	-0.576E-02
C= 0.17E+19	20000.	0.138	-0.830E-02	0.365E-01	-0.864E-02*	0.371E-01	-0.707E-02
	50000.	0.155	-0.816E-02	0.376E-01	-0.105E-01*	0.386E-01	-0.850E-02
	100000.	0.168	-0.606E-02	0.390E-01	-0.119E-01	0.381E-01	-0.968E-02
	150000.	0.170	-0.511E-02	0.397E-01	-0.128E-01	0.393E-01	-0.102E-01

PERTURBER DENSITY = 1xE+16cm-3

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 4s-7p	5000.	0.216	-0.387E-01				
2475.2 A	10000.	0.206	-0.322E-01	*0.571E-01	-0.155E-01		
C= 0.80E+18	20000.	0.219	-0.263E-01	*0.597E-01	-0.189E-01		
	50000.	0.257	-0.197E-01	*0.633E-01	-0.227E-01	*0.620E-01	-0.186E-01
	100000.	0.278	-0.136E-01	0.654E-01	-0.259E-01	*0.631E-01	-0.218E-01
	150000.	0.281	-0.114E-01	0.646E-01	-0.274E-01	*0.606E-01	-0.226E-01
Mg II 5s-5p	5000.	6.74	-2.40	0.713	-0.278	*0.750	*-0.231
21395.8 A	10000.	5.46	-2.01	0.828	-0.368	0.859	-0.302
C= 0.19E+21	20000.	5.21	-1.76	0.943	-0.449	0.937	-0.372
	50000.	5.49	-1.29	1.05	-0.552	1.02	-0.457
	100000.	5.84	-1.03	1.12	-0.638	1.06	-0.506
	150000.	5.88	-0.888	1.15	-0.670	1.10	-0.551
Mg II 5s-6p	5000.	1.30	-0.418	*0.237	*-0.593E-01		
7790.1 A	10000.	1.20	-0.350	*0.269	*-0.776E-01	*0.277	*-0.639E-01
C= 0.13E+20	20000.	1.23	-0.275	0.288	-0.952E-01	*0.291	*-0.788E-01
	50000.	1.40	-0.204	0.301	-0.117	*0.297	*-0.954E-01
	100000.	1.51	-0.158	0.313	-0.131	0.315	-0.103
	150000.	1.53	-0.137	0.327	-0.144	0.312	-0.120
Mg II 5s-7p	5000.	1.20	-0.331				
5741.8 A	10000.	1.17	-0.286	*0.308	*-0.918E-01		
C= 0.43E+19	20000.	1.25	-0.228	*0.326	*-0.112		
	50000.	1.48	-0.178	*0.343	*-0.138	*0.334	*-0.108
	100000.	1.61	-0.133	0.348	-0.149	*0.344	*-0.123
	150000.	1.62	-0.113	0.356	-0.159	*0.335	*-0.128
Mg II 6s-7p	5000.	9.10	-3.75				
14265.8 A	10000.	8.73	-3.18	* 1.97	*-0.754		
C= 0.27E+20	20000.	9.24	-2.79	* 2.09	*-0.915		
	50000.	10.8	-2.04	* 2.28	* -1.12	* 2.10	*-0.889
	100000.	11.7	-1.58	* 2.40	* -1.29	* 2.19	*-0.984
	150000.	11.8	-1.32	2.49	-1.36	* 2.34	* -1.13
Mg II 3p-4s	5000.	0.419E-01	0.173E-01	0.672E-03	0.104E-02	0.781E-03	0.913E-03
2934.7 A	10000.	0.295E-01	0.133E-01	0.125E-02	0.154E-02	0.129E-02	0.133E-02
C= 0.93E+19	20000.	0.214E-01	0.991E-02	0.193E-02	0.196E-02	0.175E-02	0.163E-02
	50000.	0.177E-01	0.746E-02	0.270E-02	0.251E-02	0.233E-02	0.205E-02
	100000.	0.163E-01	0.583E-02	0.321E-02	0.290E-02	0.281E-02	0.240E-02
	150000.	0.158E-01	0.509E-02	0.368E-02	0.319E-02	0.309E-02	0.261E-02
Mg II 3p-5s	5000.	0.326E-01	0.154E-01	0.134E-02	0.173E-02	0.133E-02	0.146E-02
1752.5 A	10000.	0.234E-01	0.145E-01	0.217E-02	0.231E-02	0.189E-02	0.190E-02
C= 0.14E+19	20000.	0.199E-01	0.121E-01	0.282E-02	0.282E-02	0.241E-02	0.232E-02
	50000.	0.175E-01	0.978E-02	0.371E-02	0.345E-02	0.298E-02	0.284E-02
	100000.	0.173E-01	0.772E-02	0.427E-02	0.393E-02	0.370E-02	0.325E-02
	150000.	0.169E-01	0.674E-02	0.470E-02	0.428E-02	0.397E-02	0.354E-02
Mg II 3p-6s	5000.	0.463E-01	0.249E-01	0.360E-02	0.343E-02	*0.315E-02	*0.274E-02
1482.2 A	10000.	0.387E-01	0.230E-01	0.475E-02	0.462E-02	0.400E-02	0.377E-02
C= 0.53E+18	20000.	0.324E-01	0.209E-01	0.615E-02	0.566E-02	0.504E-02	0.466E-02
	50000.	0.322E-01	0.162E-01	0.778E-02	0.673E-02	0.617E-02	0.546E-02
	100000.	0.317E-01	0.135E-01	0.842E-02	0.776E-02	0.688E-02	0.600E-02
	150000.	0.312E-01	0.114E-01	0.989E-02	0.834E-02	0.742E-02	0.667E-02
Mg II 3p-7s	5000.	0.737E-01	0.420E-01	*0.781E-02	*0.642E-02	*0.670E-02	*0.502E-02
1368.9 A	10000.	0.628E-01	0.428E-01	*0.980E-02	*0.902E-02	*0.825E-02	*0.728E-02
C= 0.27E+18	20000.	0.564E-01	0.367E-01	*0.124E-01	*0.110E-01	*0.985E-02	*0.897E-02
	50000.	0.593E-01	0.297E-01	0.146E-01	0.132E-01	*0.122E-01	*0.110E-01
	100000.	0.599E-01	0.232E-01	0.178E-01	0.148E-01	*0.141E-01	*0.123E-01
	150000.	0.589E-01	0.194E-01	0.168E-01	0.158E-01	*0.163E-01	*0.127E-01
Mg II 4p-5s	5000.	0.775	0.331	0.408E-01	0.375E-01	0.429E-01	0.316E-01
8230.0 A	10000.	0.578	0.305	0.575E-01	0.502E-01	0.536E-01	0.413E-01
C= 0.32E+20	20000.	0.513	0.252	0.714E-01	0.614E-01	0.648E-01	0.505E-01
	50000.	0.488	0.201	0.898E-01	0.748E-01	0.758E-01	0.611E-01
	100000.	0.502	0.157	0.101	0.851E-01	0.896E-01	0.712E-01
	150000.	0.497	0.137	0.111	0.928E-01	0.959E-01	0.766E-01

PERTURBER DENSITY = 1xE+16cm-3

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 4p-6s	5000.	0.431	0.224	0.333E-01	0.306E-01*	0.296E-01*	0.245E-01
4433.2 A	10000.	0.363	0.205	0.435E-01	0.412E-01	0.372E-01	0.336E-01
C= 0.48E+19	20000.	0.311	0.184	0.560E-01	0.506E-01	0.462E-01	0.416E-01
	50000.	0.311	0.146	0.705E-01	0.601E-01	0.563E-01	0.486E-01
	100000.	0.318	0.117	0.757E-01	0.695E-01	0.627E-01	0.534E-01
	150000.	0.315	0.993E-01	0.894E-01	0.746E-01	0.671E-01	0.594E-01
Mg II 4p-7s	5000.	0.506	0.282	*0.529E-01	*0.432E-01	*0.455E-01	*0.338E-01
3553.1 A	10000.	0.434	0.287	*0.663E-01	*0.607E-01	*0.560E-01	*0.490E-01
C= 0.18E+19	20000.	0.394	0.246	*0.838E-01	*0.744E-01	*0.668E-01	*0.603E-01
	50000.	0.419	0.198	0.984E-01	0.890E-01	*0.820E-01	*0.739E-01
	100000.	0.425	0.154	0.120	0.995E-01	*0.946E-01	*0.829E-01
	150000.	0.421	0.129	0.113	0.106	*0.110	*0.856E-01
Mg II 5p-6s	5000.	7.55	3.48	0.676	0.483	*0.645	*0.386
17444.6 A	10000.	6.53	3.16	0.833	0.649	*0.777	*0.532
C= 0.74E+20	20000.	5.93	2.83	1.01	0.791	*0.897	*0.650
	50000.	6.32	2.17	1.21	0.945	1.03	0.768
	100000.	6.56	1.80	1.31	1.10	1.08	0.843
	150000.	6.55	1.51	1.49	1.16	1.19	0.942
Mg II 5p-7s	5000.	3.35	1.75	*0.348	*0.268	*0.306	*0.209
8833.9 A	10000.	2.93	1.78	*0.433	*0.378	*0.370	*0.305
C= 0.11E+20	20000.	2.72	1.52	*0.538	*0.460	*0.437	*0.376
	50000.	2.96	1.17	0.629	0.553	*0.531	*0.458
	100000.	3.05	0.950	0.758	0.614	*0.610	*0.510
	150000.	3.03	0.793	0.716	0.660	*0.694	*0.526
Mg II 3p-3d	5000.	0.267E-01	0.444E-02	0.997E-03	0.331E-03	0.127E-02	0.306E-03
2796.3 A	10000.	0.199E-01	0.321E-02	0.149E-02	0.545E-03	0.174E-02	0.470E-03
C= 0.72E+19	20000.	0.151E-01	0.217E-02	0.187E-02	0.759E-03	0.199E-02	0.638E-03
	50000.	0.120E-01	0.186E-02	0.225E-02	0.980E-03	0.231E-02	0.809E-03
	100000.	0.109E-01	0.149E-02	0.248E-02	0.117E-02	0.244E-02	0.957E-03
	150000.	0.105E-01	0.132E-02	0.260E-02	0.127E-02	0.251E-02	0.103E-02
Mg II 3p-4d	5000.	0.423E-01	0.143E-01	0.462E-02	0.399E-02*	0.423E-02*	0.323E-02
1736.7 A	10000.	0.356E-01	0.114E-01	0.598E-02	0.532E-02	0.527E-02	0.437E-02
C= 0.15E+18	20000.	0.312E-01	0.959E-02	0.751E-02	0.657E-02	0.643E-02	0.535E-02
	50000.	0.272E-01	0.710E-02	0.948E-02	0.787E-02	0.774E-02	0.656E-02
	100000.	0.246E-01	0.556E-02	0.113E-01	0.885E-02	0.919E-02	0.711E-02
	150000.	0.231E-01	0.480E-02	0.110E-01	0.945E-02	0.945E-02	0.761E-02
Mg II 3p-5d	5000.	0.780E-01	0.324E-01*	0.127E-01*	0.929E-02		
1477.3 A	10000.	0.713E-01	0.269E-01*	0.159E-01*	0.133E-01		
C= 0.59E+17	20000.	0.662E-01	0.224E-01*	0.197E-01*	0.165E-01*	0.163E-01*	0.134E-01
	50000.	0.599E-01	0.163E-01*	0.236E-01*	0.192E-01*	0.194E-01*	0.153E-01
	100000.	0.547E-01	0.130E-01*	0.273E-01*	0.217E-01*	0.195E-01*	0.175E-01
	150000.	0.511E-01	0.108E-01*	0.317E-01*	0.245E-01*	0.222E-01*	0.185E-01
Mg II 3p-6d	5000.	0.146	0.644E-01				
1366.7 A	10000.	0.139	0.548E-01				
C= 0.30E+17	20000.	0.132	0.440E-01				
	50000.	0.121	0.329E-01				
	100000.	0.111	0.257E-01*	0.624E-01*	0.459E-01		
	150000.	0.103	0.213E-01*	0.724E-01*	0.551E-01		
Mg II 3p-7d	5000.*	0.260	*0.112				
1307.8 A	10000.	0.253	0.964E-01				
C= 0.18E+17	20000.	0.242	0.755E-01				
	50000.	0.224	0.591E-01				
	100000.	0.205	0.460E-01				
	150000.	0.191	0.379E-01				
Mg II 4p-4d	5000.	0.951	0.271	0.101	0.820E-01*	0.942E-01*	0.663E-01
7892.1 A	10000.	0.807	0.213	0.129	0.110	0.116	0.898E-01
C= 0.30E+19	20000.	0.718	0.176	0.160	0.135	0.139	0.110
	50000.	0.649	0.131	0.200	0.162	0.166	0.135
	100000.	0.607	0.103	0.236	0.182	0.194	0.146
	150000.	0.578	0.898E-01	0.232	0.194	0.200	0.156

PERTURBER DENSITY = 1xE+16cm-3

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 4p-5d	5000.	0.708	0.285	*0.113	*0.819E-01		
4389.8 A	10000.	0.648	0.234	*0.142	*0.118		
C= 0.52E+18	20000.	0.604	0.196	*0.175	*0.145	*0.144	*0.118
	50000.	0.553	0.140	*0.209	*0.169	*0.172	*0.135
	100000.	0.511	0.111	*0.242	*0.192	*0.172	*0.154
	150000.	0.480	0.932E-01	*0.280	*0.216	*0.196	*0.163
Mg II 4p-6d	5000.	0.991	0.431				
3538.4 A	10000.	0.943	0.366				
C= 0.20E+18	20000.	0.895	0.298				
	50000.	0.828	0.218				
	100000.	0.761	0.170	*0.419	*0.307		
	150000.	0.711	0.141	*0.485	*0.369		
Mg II 4p-7d	5000.	*1.53	*0.659				
3168.8 A	10000.	1.49	0.566				
C= 0.10E+18	20000.	1.43	0.454				
	50000.	1.33	0.345				
	100000.	1.22	0.268				
	150000.	1.13	0.222				
Mg II 5p-5d	5000.	11.3	4.30	* 1.72	* 1.20		
16791.0 A	10000.	10.4	3.46	* 2.14	* 1.73		
C= 0.76E+19	20000.	9.84	2.89	* 2.63	* 2.13	* 2.19	* 1.74
	50000.	9.31	2.04	* 3.10	* 2.48	* 2.56	* 1.98
	100000.	8.83	1.62	* 3.58	* 2.81	* 2.60	* 2.28
	150000.	8.41	1.34	* 4.17	* 3.17	* 2.93	* 2.40
Mg II 5p-6d	5000.	6.27	2.67				
8743.8 A	10000.	5.98	2.26				
C= 0.12E+19	20000.	5.71	1.83				
	50000.	5.36	1.33				
	100000.	5.00	1.04	* 2.56	* 1.88		
	150000.	4.70	0.858	* 2.97	* 2.26		
Mg II 5p-7d	5000.*	7.16	* 3.04				
6787.6 A	10000.	6.98	2.61				
C= 0.48E+18	20000.	6.70	2.09				
	50000.	6.28	1.58				
	100000.	5.79	1.23				
	150000.	5.41	1.02				
Mg II 3d-4p	5000.	0.620	-0.970E-03	0.513E-01	-0.277E-02	0.620E-01	-0.264E-02
10931.0 A	10000.	0.487	-0.404E-02	0.665E-01	-0.488E-02	0.719E-01	-0.436E-02
C= 0.11E+21	20000.	0.411	-0.767E-02	0.753E-01	-0.701E-02	0.804E-01	-0.607E-02
	50000.	0.382	-0.426E-02	0.850E-01	-0.949E-02	0.873E-01	-0.783E-02
	100000.	0.382	-0.451E-02	0.885E-01	-0.113E-01	0.892E-01	-0.935E-02
	150000.	0.380	-0.526E-02	0.897E-01	-0.125E-01	0.912E-01	-0.102E-01
Mg II 3d-5p	5000.	0.151	-0.342E-04	0.226E-01	-0.180E-02	*0.243E-01	-0.157E-02
3850.2 A	10000.	0.126	-0.682E-03	0.258E-01	-0.265E-02	0.275E-01	-0.229E-02
C= 0.62E+19	20000.	0.117	-0.144E-03	0.286E-01	-0.338E-02	0.295E-01	-0.281E-02
	50000.	0.122	-0.238E-03	0.304E-01	-0.433E-02	0.307E-01	-0.353E-02
	100000.	0.128	-0.361E-03	0.311E-01	-0.499E-02	0.316E-01	-0.413E-02
	150000.	0.129	0.471E-03	0.316E-01	-0.549E-02	0.318E-01	-0.448E-02
Mg II 3d-6p	5000.	0.162	-0.956E-02	*0.334E-01	-0.554E-02		
2929.5 A	10000.	0.148	-0.948E-02	*0.379E-01	-0.733E-02	*0.393E-01	-0.601E-02
C= 0.19E+19	20000.	0.150	-0.696E-02	0.405E-01	-0.897E-02	*0.411E-01	-0.740E-02
	50000.	0.168	-0.450E-02	0.421E-01	-0.109E-01	*0.426E-01	-0.891E-02
	100000.	0.180	-0.330E-02	0.427E-01	-0.128E-01	0.424E-01	-0.100E-01
	150000.	0.182	-0.236E-02	0.433E-01	-0.136E-01	0.432E-01	-0.109E-01
Mg II 3d-7p	5000.	0.232	-0.434E-01				
2583.0 A	10000.	0.223	-0.324E-01	*0.623E-01	-0.166E-01		
C= 0.87E+18	20000.	0.237	-0.230E-01	*0.654E-01	-0.204E-01		
	50000.	0.277	-0.179E-01	*0.690E-01	-0.243E-01	*0.679E-01	-0.199E-01
	100000.	0.299	-0.119E-01	0.720E-01	-0.279E-01	*0.684E-01	-0.236E-01
	150000.	0.302	-0.979E-02	0.709E-01	-0.296E-01	*0.658E-01	-0.241E-01

PERTURBER DENSITY = 1xE+16cm-3

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 4d-5p	5000.	11.3	-2.39	1.29	-0.781	* 1.28	*-0.632
24076.0 A	10000.	9.77	-1.72	1.57	-1.05	* 1.50	*-0.856
C= 0.28E+20	20000.	9.02	-1.52	1.84	-1.28	* 1.71	* -1.05
	50000.	8.77	-1.12	2.16	-1.53	1.97	-1.28
	100000.	8.65	-0.914	2.50	-1.74	2.13	-1.39
	150000.	8.44	-0.777	2.46	-1.90	2.17	-1.49
Mg II 4d-6p	5000.	1.85	-0.342	*0.283	*-0.106		
8119.2 A	10000.	1.68	-0.284	*0.329	*-0.142	*0.330	*-0.116
C= 0.32E+19	20000.	1.64	-0.226	*0.356	*-0.173	*0.346	*-0.142
	50000.	1.73	-0.168	0.392	-0.207	*0.364	*-0.167
	100000.	1.79	-0.129	0.426	-0.240	0.372	-0.186
	150000.	1.78	-0.111	0.451	-0.254	0.402	-0.206
Mg II 4d-7p	5000.	1.56	-0.344				
5918.7 A	10000.	1.47	-0.289	*0.342	*-0.120		
C= 0.17E+19	20000.	1.51	-0.226	*0.363	*-0.147		
	50000.	1.69	-0.169	*0.390	*-0.173	*0.373	*-0.141
	100000.	1.78	-0.121	0.393	-0.195	*0.377	*-0.157
	150000.	1.79	-0.101	0.430	-0.214	*0.415	*-0.180
Mg II 5d-7p	5000.	14.1	-4.72				
14734.8 A	10000.	13.3	-3.86				
C= 0.59E+19	20000.	13.4	-3.03	* 2.98	*-1.90		
	50000.	14.2	-2.25	* 3.36	*-2.31		
	100000.	14.5	-1.66	* 3.77	*-2.60	* 3.38	*-2.19
	150000.	14.2	-1.36	* 4.31	*-2.75	* 3.11	*-2.14
Mg II 3d-4f	5000.	0.269	-0.658E-02	0.214E-01	-0.194E-01	0.197E-01	-0.154E-01
4482.7 A	10000.	0.213	-0.863E-02	0.282E-01	-0.254E-01	0.250E-01	-0.209E-01
C= 0.98E+18	20000.	0.173	-0.111E-01	0.354E-01	-0.313E-01	0.306E-01	-0.258E-01
	50000.	0.144	-0.831E-02	0.463E-01	-0.382E-01	0.378E-01	-0.313E-01
	100000.	0.128	-0.639E-02	0.544E-01	-0.432E-01	0.416E-01	-0.335E-01
	150000.	0.120	-0.521E-02	0.609E-01	-0.466E-01	0.470E-01	-0.390E-01
Mg II 3d-5f	5000.	0.569	-0.371E-01				
3105.8 A	10000.	0.497	-0.230E-01				
C= 0.15E+17	20000.	0.432	-0.160E-01				
	50000.	0.356	-0.518E-02				
	100000.	0.303	-0.754E-03				
	150000.	0.273	-0.224E-02				
Mg II 3d-6f	5000.	*0.954	*-0.892E-01				
2661.6 A	10000.	0.881	-0.583E-01				
C= 0.69E+16	20000.	0.793	-0.372E-01				
	50000.	0.668	-0.170E-01				
	100000.	0.570	-0.360E-02				
	150000.	0.513	-0.101E-01				
Mg II 3d-7f	5000.	* 1.46	*-0.164				
2450.4 A	10000.	* 1.42	*-0.110				
C= 0.38E+16	20000.	* 1.32	*-0.762E-01				
	50000.	1.14	-0.456E-01				
	100000.	0.978	-0.199E-01				
	150000.	0.882	-0.295E-01				
Mg II 4d-5f	5000.	6.28	-0.655				
9634.8 A	10000.	5.51	-0.517				
C= 0.15E+18	20000.	4.83	-0.378				
	50000.	4.05	-0.163				
	100000.	3.49	-0.154				
	150000.	3.17	-0.127				
Mg II 4d-6f	5000.	* 5.77	*-0.611				
6348.6 A	10000.	5.32	-0.459				
C= 0.39E+17	20000.	4.80	-0.311				
	50000.	4.06	-0.558E-01				
	100000.	3.49	-0.861E-01				
	150000.	3.15	-0.695E-01				

PERTURBER DENSITY = 1xE+16cm-3

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 4d-7f	5000.*	6.96	*-0.814				
5265.7 A	10000.*	6.76	*-0.602				
C= 0.18E+17	20000.*	6.30	*-0.413				
	50000.	5.43	-0.528E-01				
	100000.	4.68	-0.137				
	150000.	4.23	-0.969E-01				
Mg II 4f-5d	5000.	4.78	1.75	*0.682	*0.488		
10394.8 A	10000.	4.29	1.42	*0.848	*0.708		
C= 0.29E+19	20000.	3.92	1.17	* 1.01	*0.846	*0.848	*0.688
	50000.	3.52	0.827	* 1.15	* 1.02	*0.981	*0.808
	100000.	3.20	0.655	* 1.43	* 1.16	* 1.05	*0.950
	150000.	2.98	0.544	* 1.65	* 1.23	* 1.17	*0.968
Mg II 4f-6d	5000.	3.81	1.59				
6622.0 A	10000.	3.57	1.34				
C= 0.71E+18	20000.	3.35	1.08				
	50000.	3.07	0.783				
	100000.	2.80	0.611				
	150000.	2.61	0.504	* 1.77	* 1.30		
Mg II 4f-7d	5000.*	4.75	* 1.99				
5435.6 A	10000.*	4.58	* 1.70				
C= 0.31E+18	20000.	4.36	1.36				
	50000.	4.03	1.03				
	100000.	3.67	0.799				
	150000.	3.42	0.660				

PERTURBER DENSITY = 1xE+17cm-3

Mg II 3s-3p	5000.	0.173	-0.337E-03	0.260E-02	-0.569E-04	0.380E-02	-0.569E-04
2798.7 A	10000.	0.126	-0.392E-03	0.473E-02	-0.127E-03	0.588E-02	-0.126E-03
C= 0.27E+21	20000.	0.911E-01	-0.443E-03	0.678E-02	-0.254E-03	0.772E-02	-0.242E-03
	50000.	0.651E-01	-0.481E-03	0.846E-02	-0.486E-03	0.906E-02	-0.420E-03
	100000.	0.559E-01	-0.541E-03	0.944E-02	-0.670E-03	0.990E-02	-0.564E-03
	150000.	0.525E-01	-0.513E-03	0.988E-02	-0.751E-03	0.101E-01	-0.628E-03
Mg II 3s-4p	5000.	0.726E-01	0.620E-02	0.546E-02	0.280E-03*	0.654E-02*	0.267E-03
1240.1 A	10000.	0.561E-01	0.387E-02	0.743E-02	0.530E-03*	0.796E-02*	0.475E-03
C= 0.14E+20	20000.	0.460E-01	0.282E-02	0.849E-02	0.804E-03	0.906E-02	0.699E-03
	50000.	0.416E-01	0.249E-02	0.968E-02	0.112E-02	0.993E-02	0.925E-03
	100000.	0.410E-01	0.204E-02	0.101E-01	0.134E-02	0.103E-01	0.110E-02
	150000.	0.405E-01	0.179E-02	0.103E-01	0.148E-02	0.103E-01	0.120E-02
Mg II 3s-5p	5000.	0.103	0.880E-02*	0.144E-01	-0.812E-03		
1026.0 A	10000.	0.861E-01	0.667E-02*	0.173E-01	-0.131E-02		
C= 0.44E+19	20000.	0.795E-01	0.452E-02*	0.196E-01	-0.183E-02		
	50000.	0.822E-01	0.342E-02*	0.210E-01	-0.239E-02*	0.213E-01	-0.197E-02
	100000.	0.860E-01	0.226E-02	0.216E-01	-0.282E-02*	0.218E-01	-0.228E-02
	150000.	0.867E-01	0.220E-02	0.219E-01	-0.305E-02*	0.220E-01	-0.248E-02
Mg II 3s-6p	5000.	0.165	-0.685E-02				
946.7 A	10000.	0.151	-0.533E-02				
C= 0.20E+19	20000.	0.153	-0.392E-02				
	50000.	0.171	-0.160E-02*	0.436E-01	-0.112E-01		
	100000.	0.184	-0.113E-02*	0.441E-01	-0.131E-01		
	150000.	0.186	-0.798E-03*	0.442E-01	-0.138E-01		
Mg II 3s-7p	5000.*	0.282	*-0.484E-01				
907.4 A	10000.	0.271	-0.376E-01				
C= 0.11E+19	20000.	0.289	-0.238E-01				
	50000.	0.338	-0.194E-01				
	100000.	0.365	-0.117E-01				
	150000.	0.369	-0.104E-01				
Mg II 4s-4p	5000.	5.14	-1.22	0.307	-0.777E-01	*0.366	*-0.677E-01
9229.4 A	10000.	3.93	-0.906	0.421	-0.124	*0.447	*-0.105
C= 0.78E+21	20000.	3.27	-0.661	0.486	-0.169	*0.512	*-0.140
	50000.	3.13	-0.496	0.564	-0.222	0.563	-0.182
	100000.	3.18	-0.394	0.592	-0.261	0.596	-0.210
	150000.	3.18	-0.353	0.626	-0.278	0.611	-0.227

PERTURBER DENSITY = 1xE+17cm-3

TRANSITION	T(K)	PERTURBERS ARE: ELECTRONS WIDTH(A)	SHIFT(A)	PROTONS WIDTH(A)	SHIFT(A)	IONIZED HELIUM WIDTH(A)	SHIFT(A)
Mg II 4s-5p	5000.	1.36	-0.968E-01	*0.179	*-0.204E-01		
3615.4 A	10000.	1.14	-0.770E-01	*0.215	*-0.317E-01		
C= 0.54E+20	20000.	1.07	-0.668E-01	*0.245	*-0.420E-01		
	50000.	1.13	-0.560E-01	*0.262	*-0.551E-01	*0.266	*-0.450E-01
	100000.	1.20	-0.520E-01	0.272	-0.635E-01	*0.270	*-0.509E-01
	150000.	1.21	-0.417E-01	0.269	-0.678E-01	*0.271	*-0.560E-01
Mg II 4s-6p	5000.	1.50	-0.851E-01				
2791.6 A	10000.	1.36	-0.114				
C= 0.17E+20	20000.	1.38	-0.755E-01				
	50000.	1.55	-0.788E-01	*0.375	*-0.104		
	100000.	1.68	-0.600E-01	*0.390	*-0.119		
	150000.	1.70	-0.506E-01	*0.397	*-0.128		
Mg II 4s-7p	5000.*	2.15	*-0.334				
2475.2 A	10000.*	2.06	*-0.285				
C= 0.80E+19	20000.	2.19	-0.234				
	50000.	2.57	-0.185				
	100000.	2.78	-0.134				
	150000.	2.81	-0.112				
Mg II 5s-6p	5000.	13.0	-3.98				
7790.1 A	10000.	12.0	-3.37				
C= 0.13E+21	20000.	12.3	-2.66				
	50000.	14.0	-1.98	* 3.00	*-1.16		
	100000.	15.1	-1.56	* 3.13	*-1.31		
	150000.	15.3	-1.36	* 3.27	*-1.44		
Mg II 5s-7p	5000.*	12.0	*-2.97				
5741.8 A	10000.*	11.6	*-2.63				
C= 0.43E+20	20000.	12.5	-2.12				
	50000.	14.8	-1.69				
	100000.	16.1	-1.29				
	150000.	16.2	-1.12				
Mg II 3p-4s	5000.	0.419	0.172	0.667E-02	0.894E-02	0.773E-02	0.764E-02
2934.7 A	10000.	0.295	0.132	0.125E-01	0.140E-01	0.129E-01	0.119E-01
C= 0.93E+20	20000.	0.214	0.983E-01	0.193E-01	0.191E-01	0.175E-01	0.157E-01
	50000.	0.177	0.740E-01	0.270E-01	0.250E-01	0.233E-01	0.204E-01
	100000.	0.163	0.581E-01	0.321E-01	0.290E-01	0.281E-01	0.240E-01
	150000.	0.158	0.509E-01	0.368E-01	0.319E-01	0.309E-01	0.261E-01
Mg II 3p-5s	5000.	0.326	0.150	0.134E-01	0.135E-01*0.133E-01*0.107E-01		
1752.5 A	10000.	0.234	0.142	0.217E-01	0.196E-01*0.189E-01*0.155E-01		
C= 0.14E+20	20000.	0.199	0.119	0.282E-01	0.267E-01*0.242E-01*0.218E-01		
	50000.	0.175	0.965E-01	0.372E-01	0.343E-01*0.298E-01*0.281E-01		
	100000.	0.173	0.766E-01	0.427E-01	0.393E-01	0.370E-01	0.325E-01
	150000.	0.169	0.673E-01	0.470E-01	0.428E-01	0.397E-01	0.354E-01
Mg II 3p-6s	5000.	0.463	0.235	*0.355E-01*0.220E-01			
1482.2 A	10000.	0.387	0.220	*0.471E-01*0.351E-01			
C= 0.53E+19	20000.	0.324	0.202	*0.614E-01*0.522E-01			
	50000.	0.322	0.158	*0.778E-01*0.665E-01			
	100000.	0.317	0.133	*0.842E-01*0.776E-01*0.688E-01*0.600E-01			
	150000.	0.312	0.114	*0.989E-01*0.834E-01*0.742E-01*0.667E-01			
Mg II 3p-7s	5000.*	0.736	*0.378				
1368.9 A	10000.*	0.628	*0.399				
C= 0.27E+19	20000.	0.564	0.347				
	50000.	0.593	0.285				
	100000.	0.599	0.226				
	150000.	0.589	0.193				
Mg II 4p-5s	5000.	7.75	3.21	*0.401	*0.293	*0.412	*0.233
8230.0 A	10000.	5.77	2.99	*0.572	*0.427	*0.531	*0.338
C= 0.32E+21	20000.	5.13	2.47	0.714	0.583	*0.649	*0.475
	50000.	4.88	1.98	0.898	0.742	*0.758	*0.606
	100000.	5.02	1.55	1.01	0.851	*0.896	*0.712
	150000.	4.97	1.37	1.11	0.928	0.959	0.766

PERTURBER DENSITY = 1xE+17cm-3

TRANSITION	T(K)	PERTURBERS ARE: ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 4p-6s	5000.	4.31	2.11				
4433.2 A	10000.	3.63	1.96	*0.430	*0.313		
C= 0.48E+20	20000.	3.11	1.78	*0.559	*0.466		
	50000.	3.10	1.43	*0.705	*0.594		
	100000.	3.18	1.15	*0.757	*0.695	*0.627	*0.534
	150000.	3.15	0.990	*0.894	*0.746	*0.671	*0.594
Mg II 4p-7s	5000.*	5.06	* 2.54				
3553.1 A	10000.*	4.34	* 2.68				
C= 0.18E+20	20000.	3.93	2.32				
	50000.	4.19	1.90				
	100000.	4.25	1.50				
	150000.	4.21	1.28				
Mg II 3p-3d	5000.	0.267	0.440E-01	0.976E-02	0.291E-02	0.123E-01	0.265E-02
2796.3 A	10000.	0.199	0.318E-01	0.148E-01	0.508E-02	0.172E-01	0.433E-02
C= 0.72E+20	20000.	0.151	0.214E-01	0.187E-01	0.743E-02	0.198E-01	0.622E-02
	50000.	0.120	0.185E-01	0.225E-01	0.977E-02	0.231E-01	0.806E-02
	100000.	0.109	0.149E-01	0.248E-01	0.117E-01	0.244E-01	0.957E-02
	150000.	0.105	0.132E-01	0.260E-01	0.127E-01	0.251E-01	0.103E-01
Mg II 3p-4d	5000.	0.422	0.127	*0.451E-01	*0.268E-01		
1736.7 A	10000.	0.356	0.103	*0.592E-01	*0.414E-01		
C= 0.15E+19	20000.	0.312	0.877E-01	*0.751E-01	*0.607E-01		
	50000.	0.271	0.686E-01	*0.948E-01	*0.778E-01	*0.774E-01	*0.647E-01
	100000.	0.246	0.533E-01	*0.113	*0.885E-01	*0.919E-01	*0.711E-01
	150000.	0.231	0.477E-01	*0.110	*0.945E-01	*0.945E-01	*0.761E-01
Mg II 3p-5d	5000.	*0.756	*0.247				
1477.3 A	10000.	0.697	0.216				
C= 0.59E+18	20000.	0.651	0.188				
	50000.	0.592	0.152				
	100000.	0.542	0.119				
	150000.	0.507	0.107				
Mg II 3p-6d	5000.*	1.28	*0.401				
1366.7 A	10000.*	1.27	*0.383				
C= 0.30E+18	20000.*	1.24	*0.325				
	50000.	1.16	0.288				
	100000.	1.07	0.219				
	150000.	1.00	0.207				
Mg II 3p-7d	5000.						
1307.8 A	10000.						
C= 0.18E+18	20000.*	2.10	*0.484				
	50000.*	2.05	*0.484				
	100000.*	1.91	*0.357				
	150000.	1.79	0.363				
Mg II 4p-4d	5000.	9.49	2.37	*0.974	*0.552		
7892.1 A	10000.	8.06	1.90	* 1.27	*0.852		
C= 0.30E+20	20000.	7.17	1.59	* 1.60	* 1.25		
	50000.	6.48	1.24	* 2.00	* 1.60	* 1.65	* 1.33
	100000.	6.07	1.02	* 2.36	* 1.82	* 1.94	* 1.46
	150000.	5.77	0.891	* 2.32	* 1.94	* 2.00	* 1.56
Mg II 4p-5d	5000.*	6.87	* 2.17				
4389.8 A	10000.	6.34	1.88				
C= 0.52E+19	20000.	5.95	1.62				
	50000.	5.47	1.30				
	100000.	5.07	1.09				
	150000.	4.77	0.918				
Mg II 4p-6d	5000.						
3538.4 A	10000.*	8.64	* 2.56				
C= 0.20E+19	20000.*	8.41	* 2.16				
	50000.	7.94	1.91				
	100000.	7.37	1.66				
	150000.	6.91	1.37				

PERTURBER DENSITY = 1xE+17cm-3

TRANSITION	T(K)	PERTURBERS ARE: ELECTRONS WIDTH(A)	SHIFT(A)	PROTONS WIDTH(A)	SHIFT(A)	IONIZED HELIUM WIDTH(A)	SHIFT(A)
Mg II 4p-7d	5000.						
3168.8 A	10000.						
C= 0.10E+19	20000.*	12.4	* 2.83				
	50000.*	12.1	* 2.82				
	100000.*	11.4	* 2.56				
	150000.	10.7	2.12				
Mg II 3d-4p	5000.	6.20	-0.343E-02	0.494	-0.244E-01*0.584		*-0.232E-01
10931.0 A	10000.	4.87	-0.349E-01	0.657	-0.458E-01*0.704		*-0.406E-01
C= 0.11E+22	20000.	4.11	-0.754E-01	0.751	-0.688E-01*0.800		*-0.594E-01
	50000.	3.82	-0.420E-01	0.850	-0.947E-01	0.872	-0.781E-01
	100000.	3.82	-0.450E-01	0.885	-0.113	0.892	-0.935E-01
	150000.	3.80	-0.525E-01	0.897	-0.125	0.912	-0.102
Mg II 3d-5p	5000.	1.51	0.183E-02*0.208		*-0.154E-01		
3850.2 A	10000.	1.26	-0.441E-02*0.251		*-0.242E-01		
C= 0.62E+20	20000.	1.17	0.101E-02*0.284		*-0.329E-01		
	50000.	1.22	-0.190E-02*0.304		*-0.431E-01*0.307		*-0.352E-01
	100000.	1.28	-0.353E-02	0.311	-0.499E-01*0.316		*-0.413E-01
	150000.	1.29	0.481E-02	0.316	-0.549E-01*0.318		*-0.448E-01
Mg II 3d-6p	5000.	1.62	-0.796E-01				
2929.5 A	10000.	1.48	-0.842E-01				
C= 0.19E+20	20000.	1.50	-0.626E-01				
	50000.	1.67	-0.405E-01*0.420		*-0.108		
	100000.	1.80	-0.326E-01*0.427		*-0.128		
	150000.	1.82	-0.231E-01*0.433		*-0.136		
Mg II 3d-7p	5000.*	2.32	*-0.376				
2583.0 A	10000.*	2.23	*-0.284				
C= 0.87E+19	20000.	2.37	-0.199				
	50000.	2.77	-0.171				
	100000.	2.99	-0.118				
	150000.	3.02	-0.967E-01				
Mg II 4d-6p	5000.*	18.5	* -2.95				
8119.2 A	10000.	16.8	-2.51				
C= 0.32E+20	20000.	16.4	-2.02				
	50000.	17.3	-1.59				
	100000.	17.9	-1.28	* 4.26		*-2.40	
	150000.	17.7	-1.09	* 4.51		*-2.54	
Mg II 4d-7p	5000.*	15.6	*-2.94				
5918.7 A	10000.*	14.6	*-2.55				
C= 0.17E+20	20000.	15.0	-2.04				
	50000.	16.9	-1.59				
	100000.	17.8	-1.19				
	150000.	17.8	-0.992				
Mg II 3d-4f	5000.	2.68	0.312E-02*0.210		*-0.141		
4482.7 A	10000.	2.12	-0.395E-01*0.279		*-0.206		
C= 0.98E+19	20000.	1.73	-0.771E-01*0.355		*-0.293	*0.305	*-0.237
	50000.	1.44	-0.699E-01*0.463		*-0.378	*0.378	*-0.309
	100000.	1.28	-0.622E-01*0.544		*-0.432	*0.416	*-0.335
	150000.	1.19	-0.500E-01	0.609	-0.466	*0.470	*-0.390
Mg II 3d-5f	5000.*	4.29	*-0.292				
3105.8 A	10000.*	3.98	*-0.202				
C= 0.15E+18	20000.	3.62	-0.176				
	50000.	3.12	-0.691E-01				
	100000.	2.72	-0.246E-01				
	150000.	2.48	-0.361E-01				
Mg II 3d-6f	5000.						
2661.6 A	10000.*	6.21	*-0.364				
C= 0.69E+17	20000.*	6.09	*-0.281				
	50000.*	5.51	*-0.145				
	100000.	4.88	-0.548E-01				
	150000.	4.46	-0.117				

PERTURBER DENSITY = 1xE+17cm-3

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
Mg II 3d-7f	5000.						
2450.4 A	10000.						
C= 0.38E+17	20000.						
	50000.*	8.88	*-0.301				
	100000.*	8.02	*-0.193				
	150000.	7.38	-0.290				

PERTURBER DENSITY = 1xE+18cm-3

Mg II 3s-3p	5000.	1.73	-0.308E-02	0.218E-01	-0.376E-03	0.302E-01	-0.376E-03
2798.7 A	10000.	1.26	-0.365E-02	0.460E-01	-0.111E-02	0.563E-01	-0.110E-02
C= 0.27E+22	20000.	0.911	-0.434E-02	0.672E-01	-0.239E-02	0.761E-01	-0.227E-02
	50000.	0.651	-0.474E-02	0.845E-01	-0.481E-02	0.904E-01	-0.415E-02
	100000.	0.559	-0.535E-02	0.944E-01	-0.669E-02	0.989E-01	-0.563E-02
	150000.	0.525	-0.511E-02	0.988E-01	-0.750E-02	0.101	-0.627E-02
Mg II 3s-4p	5000.	0.726	0.604E-01*0.351E-01*0.180E-02				
1240.1 A	10000.	0.561	0.378E-01*0.678E-01*0.449E-02				
C= 0.14E+21	20000.	0.460	0.274E-01*0.820E-01*0.729E-02				
	50000.	0.416	0.244E-01*0.963E-01*0.109E-01				
	100000.	0.410	0.201E-01*0.101	*0.133E-01*0.103		*0.110E-01	
	150000.	0.405	0.177E-01*0.103	*0.147E-01*0.103		*0.120E-01	
Mg II 3s-5p	5000.*	1.02	*0.938E-01				
1026.0 A	10000.*	0.860	*0.706E-01				
C= 0.44E+20	20000.	0.795	0.479E-01				
	50000.	0.822	0.358E-01				
	100000.	0.860	0.238E-01				
	150000.	0.867	0.226E-01				
Mg II 3s-6p	5000.						
946.7 A	10000.*	1.50	*-0.158E-01				
C= 0.20E+20	20000.*	1.52	*-0.139E-01				
	50000.*	1.71	*-0.435E-03				
	100000.	1.84	-0.774E-03				
	150000.	1.86	-0.204E-02				
Mg II 3s-7p	5000.						
907.4 A	10000.						
C= 0.11E+20	20000.						
	50000.*	3.35	*-0.118				
	100000.*	3.64	*-0.656E-01				
	150000.*	3.68	*-0.766E-01				
Mg II 4s-5p	5000.*	13.6	*-0.805				
3615.4 A	10000.*	11.4	*-0.669				
C= 0.54E+21	20000.	10.6	-0.592				
	50000.	11.3	-0.512				
	100000.	12.0	-0.483				
	150000.	12.1	-0.399				
Mg II 4s-6p	5000.						
2791.6 A	10000.*	13.5	*-0.782				
C= 0.17E+21	20000.*	13.7	*-0.513				
	50000.*	15.5	*-0.617				
	100000.	16.8	-0.482				
	150000.	17.0	-0.450				
Mg II 3p-4s	5000.	4.19	1.65	0.603E-01	0.490E-01	*0.656E-01	*0.361E-01
2934.7 A	10000.	2.95	1.28	0.123	0.108	*0.125	*0.866E-01
C= 0.93E+21	20000.	2.14	0.956	0.192	0.160	*0.175	*0.128
	50000.	1.77	0.724	0.270	0.239	*0.233	*0.193
	100000.	1.63	0.569	0.321	0.288	*0.281	*0.238
	150000.	1.58	0.503	0.368	0.317	*0.309	*0.259
Mg II 3p-5s	5000.*	3.26	* 1.34				
1752.5 A	10000.*	2.34	* 1.32				
C= 0.14E+21	20000.	1.99	1.12				
	50000.	1.75	0.921				
	100000.	1.73	0.735	*0.426	*0.387		
	150000.	1.69	0.656	*0.470	*0.423		

TRANSITION	T(K)	ELECTRONS WIDTH(A)	ELECTRONS SHIFT(A)	PROTONS WIDTH(A)	PROTONS SHIFT(A)	IONIZED HELIUM WIDTH(A)	IONIZED HELIUM SHIFT(A)
PERTURBER DENSITY = 1xE+18cm-3							
PERTURBERS ARE:							
Mg II 3p-6s	5000.						
1482.2 A	10000.*	3.86	* 1.86				
C= 0.53E+20	20000.*	3.24	* 1.79				
	50000.	3.22	1.43				
	100000.	3.17	1.23				
	150000.	3.11	1.08				
Mg II 3p-7s	5000.						
1368.9 A	10000.						
C= 0.27E+20	20000.						
	50000.*	5.89	* 2.42				
	100000.*	5.96	* 1.97				
	150000.*	5.87	* 1.76				
Mg II 3p-3d	5000.	2.67	0.423	*0.762E-01	*0.180E-01	*0.830E-01	*0.155E-01
2796.3 A	10000.	1.99	0.307	*0.141	*0.418E-01	*0.159	*0.344E-01
C= 0.72E+21	20000.	1.51	0.206	0.184	0.659E-01	*0.193	*0.540E-01
	50000.	1.20	0.180	0.224	0.946E-01	*0.230	*0.775E-01
	100000.	1.09	0.145	0.248	0.117	*0.244	*0.951E-01
	150000.	1.05	0.130	0.260	0.127	0.251	0.102
Mg II 3p-4d	5000.*	3.76	*0.737				
1736.7 A	10000.*	3.30	*0.684				
C= 0.15E+20	20000.	2.95	0.641				
	50000.	2.61	0.509				
	100000.	2.39	0.425				
	150000.	2.25	0.414				
Mg II 3p-5d	5000.						
1477.3 A	10000.						
C= 0.59E+19	20000.*	5.39	* 1.09				
	50000.*	5.23	*0.876				
	100000.*	4.94	*0.792				
	150000.	4.68	0.812				
Mg II 3p-6d	5000.						
1366.7 A	10000.						
C= 0.30E+19	20000.						
	50000.						
	100000.*	9.08	* 1.24				
	150000.*	8.69	* 1.37				
Mg II 3d-6p	5000.						
2929.5 A	10000.*	14.7	*-0.471				
C= 0.19E+21	20000.*	14.9	*-0.379				
	50000.*	16.7	*-0.250				
	100000.	18.0	-0.203				
	150000.	18.2	-0.173				
Mg II 3d-4f	5000.*	24.5	* 2.19				
4482.7 A	10000.*	19.9	* 1.03				
C= 0.98E+20	20000.	16.5	0.191				
	50000.	13.9	0.240E-01				
	100000.	12.4	-0.988E-01				
	150000.	11.7	-0.240				
PERTURBER DENSITY = 1xE+19cm-3							
Mg II 3s-3p	5000.*	17.3	*-0.192E-01	*0.705E-01	-0.105E-02		
2798.7 A	10000.*	12.6	*-0.298E-01	*0.319	*-0.697E-02		
C= 0.27E+23	20000.	9.11	-0.392E-01	*0.627	*-0.204E-01		
	50000.	6.51	-0.451E-01	*0.831	*-0.451E-01	*0.877	*-0.386E-01
	100000.	5.59	-0.516E-01	*0.940	*-0.657E-01	*0.982	*-0.550E-01
	150000.	5.25	-0.495E-01	0.988	-0.748E-01	1.01	-0.625E-01
Mg II 3s-4p	5000.						
1240.1 A	10000.*	5.59	*0.347				
C= 0.14E+22	20000.*	4.59	*0.254				
	50000.	4.16	0.228				
	100000.	4.10	0.189				
	150000.	4.05	0.170				

PERTURBER DENSITY = 1xE+19cm-3
PERTURBERS ARE: ELECTRONS PROTONS IONIZED HELIUM

TRANSITION	T(K)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)	WIDTH(A)	SHIFT(A)
Mg II 3s-5p	5000.						
1026.0 A	10000.						
C= 0.44E+21	20000.						
	50000.*	8.16	*0.421				
	100000.*	8.56	*0.283				
	150000.*	8.64	*0.258				
Mg II 3p-3d	5000.						
2796.3 A	10000.*	19.8	* 2.69				
C= 0.72E+22	20000.*	15.1	* 1.81				
	50000.	12.0	1.64				
	100000.	10.9	1.34	* 2.47	* 1.10		
	150000.	10.5	1.21	* 2.59	* 1.26		

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 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 $0.1 < NV \leq 0.5$ are denoted by an asterisk. When the impact approximation is not valid, the ion broadening contribution may be estimated by using quasistatic approach (Sahal–Bréchot 1991 and Griem 1974). The accuracy of the results obtained decreases when broadening by ion interactions becomes important.

The analysis of present results and comparison with available theoretical data will be published elsewhere (Dimitrijević and Sahal–Bréchot, 1995).

Acknowledgements – This work is a part of the project "Physics and dynamics of celestial bodies", supported by Ministry of Science and Technology of Serbia.

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ТАБЕЛЕ ПАРАМЕТАРА ШТАРКОВОГ ШИРЕЊА Mg II

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УДК 52–355.3
Претходно саопштење

Користећи семикласичан прилаз, израчунате су ширине и помераји спектралних линија, проузроковани сударима са електронима, протонима и јонизованим хелијумом, за 52 мултиплета Mg II. Резултати су дати у функцији температуре и концентрације пертурбера.