Serb. Astron. J. № 159 (1999), 59 – 64 **UDC 52–355.3**
Preliminary report

STARK BROADENING PARAMETER TABLES FOR Au I AND Au II

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(Received: January 18, 1999)

SUMMARY: Using the semiclassical perturbation formalism, we have calculated electron-, proton-, and ionized helium-impact line widths and shifts for six Au I lines as a function of temperature and perturber density. Electron-impact broadening parameters for eight Au II transitions have been calculated within the modified semiempirical approach.

1. INTRODUCTION

Spectral lines of gold have been observed in Hg-Mn and other chemically peculiar stars (see e.g. Fuhrmann 1988, Adelman 1994, Wahlgren *et al.* 1995) and the corresponding Stark broadening data for such lines are of interest for the qualitative and quantitative interpretation of stellar spectra and gold abundance determinations. In order to provide the relevant Stark broadening data needed in astrophysics and for investigation of laboratory plasmas, we have calculated within the semiclassical-perturbation formalism (Sahal−Bréchot, 1969ab) electron-, proton-, and ionized helium-impact line widths and shifts for six Au I lines as a function of temperature and perturber density. Since for Au II lines a sufficiently complete set of reliable atomic data needed for the application of the full semiclassical perturbation approach in an adequate way does not exist, the modified semiempirical method (Dimitrijević and Konjević 1980, Dimitrijević and Kršljanin 1986, Popović and Dimitrijević 1996) has been used. Electron - impact broadening parameters for eight Au II transitions, have been calculated as a function of temperature for an electron density of 10^{17}cm^{-3}, since within the used theoretical formalism, the behaviour of electron-impact broadening parameters with density is linear.

2. RESULTS AND DISCUSSION

The analysis of obtained results, the analysis of the influence of Stark broadening effect in hot star atmospheres, and all details of calculations will be published elsewhere (Popović *et al.* 1999). Here, we present only Tables of obtained Stark broadening parameters, needed for astrophysical and laboratory plasma diagnostic purposes. A summary of the semiclassical perturbation formalism (Sahal−Bréchot, 1969ab) for neutral emitters is given in Dimitrijević and Sahal-Bréchot (1984). We note here only that the inelastic collision contribution is included in the ion-impact line widths. Energy levels for Au I lines have been taken from Moore (1971). The LS-coupling and the Coulomb approximation have been applied for the oscillator strength calculations. In addition to electron-impact full halfwidths and shifts, Stark-broadening parameters due to proton-, and He II- impacts have been calculated. Our results for six Au I lines are shown in Table 1, for perturber densities 10^{15}– 10^{19} cm^{-3} and temperatures T = 2,500 – 50,000 K. 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 Tables 1 and 2, the collision

Table 1. This table shows electron-, proton-, and He II-impact broadening parameters for Au I transitions, calculated within the full semiclassical perturbation approach (Sahal-Bréchot 1969ab) for perturber densities of $10^{15} - 10^{19}$ cm^{-3} and temperatures from 2,500 up to 50,000 K. Transitions and wavelengths (in nm) are also given. 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. Stark broadening parameters for densities lower than tabulated, are linear with perturber density.

PERTURBER DENSITY = 1.E+15cm^{-3}

PERTURBERS ARE:		ELECTRONS		PROTONS		IONIZED HELIUM	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
6s2S-6p2Po1/2	2500.	0.144E-03	0.602E-04	0.957E-04	0.166E-04	0.955E-04	0.132E-04
Au I 2676.7 Å	5000.	0.167E-03	0.690E-04	0.959E-04	0.186E-04	0.956E-04	0.148E-04
C=0.12E+19	10000.	0.175E-03	0.701E-04	0.961E-04	0.210E-04	0.957E-04	0.167E-04
	20000.	0.191E-03	0.627E-04	0.964E-04	0.236E-04	0.959E-04	0.188E-04
	30000.	0.213E-03	0.496E-04	0.966E-04	0.252E-04	0.960E-04	0.201E-04
	50000.	0.259E-03	0.360E-04	0.970E-04	0.275E-04	0.962E-04	0.219E-04
6s2S-6p2Po3/2	2500.	0.164E-03	0.101E-03	0.104E-03	0.278E-04	0.103E-03	0.221E-04
Au I 2428.7 Å	5000.	0.192E-03	0.120E-03	0.105E-03	0.313E-04	0.104E-03	0.249E-04
C=0.79E+18	10000.	0.209E-03	0.132E-03	0.106E-03	0.352E-04	0.104E-03	0.280E-04
	20000.	0.230E-03	0.133E-03	0.107E-03	0.396E-04	0.105E-03	0.315E-04
	30000.	0.254E-03	0.134E-03	0.108E-03	0.424E-04	0.105E-03	0.338E-04
	50000.	0.295E-03	0.109E-03	0.109E-03	0.462E-04	0.106E-03	0.368E-04
6s2S-7p2Po1/2	2500.	0.117E-02	0.844E-03	0.381E-03	0.217E-03	0.356E-03	0.171E-03
Au I 1665.8 Å	5000.	0.131E-02	0.965E-03	0.400E-03	0.248E-03	0.368E-03	0.196E-03
C=0.53E+17	10000.	0.145E-02	0.100E-02	0.422E-03	0.282E-03	0.382E-03	0.223E-03
	20000.	0.160E-02	0.917E-03	0.448E-03	0.319E-03	0.400E-03	0.253E-03
	30000.	0.171E-02	0.805E-03	0.466E-03	0.342E-03	0.413E-03	0.272E-03
	50000.	0.184E-02	0.672E-03	0.491E-03	0.373E-03	0.430E-03	0.297E-03
6s2S-7p2Po3/2	2500.	0.154E-02	0.114E-02	0.454E-03	0.290E-03	0.412E-03	0.228E-03
Au I 1646.7 Å	5000.	0.172E-02	0.127E-02	0.483E-03	0.333E-03	0.432E-03	0.263E-03
C=0.33E+17	10000.	0.187E-02	0.127E-02	0.517E-03	0.379E-03	0.456E-03	0.300E-03
	20000.	0.202E-02	0.113E-02	0.558E-03	0.430E-03	0.484E-03	0.341E-03
	30000.	0.212E-02	0.990E-03	0.586E-03	0.461E-03	0.503E-03	0.366E-03
	50000.	0.222E-02	0.825E-03	0.626E-03	0.503E-03	0.530E-03	0.400E-03
6s2S-8p2Po1/2	2500.	0.403E-02	0.288E-02	0.119E-02	0.699E-03	*0.108E-02	*0.542E-03
Au I 1501.4 Å	5000.	0.453E-02	0.326E-02	0.126E-02	0.817E-03	0.114E-02	0.640E-03
C=0.19E+17	10000.	0.501E-02	0.327E-02	0.134E-02	0.939E-03	0.119E-02	0.740E-03
	20000.	0.558E-02	0.279E-02	0.144E-02	0.107E-02	0.126E-02	0.847E-03
	30000.	0.600E-02	0.242E-02	0.150E-02	0.115E-02	0.131E-02	0.913E-03
	50000.	0.642E-02	0.201E-02	0.160E-02	0.126E-02	0.137E-02	0.100E-02
6s2S-8p2Po1/2	2500.	0.550E-02	0.396E-02	0.146E-02	0.949E-03	*0.129E-02	*0.731E-03
Au I 1494.5 Å	5000.	0.605E-02	0.432E-02	0.157E-02	0.112E-02	*0.137E-02	*0.872E-03
C=0.12E+17	10000.	0.651E-02	0.419E-02	0.170E-02	0.129E-02	0.146E-02	0.102E-02
	20000.	0.705E-02	0.346E-02	0.185E-02	0.147E-02	0.157E-02	0.117E-02
	30000.	0.741E-02	0.297E-02	0.196E-02	0.159E-02	0.164E-02	0.126E-02
	50000.	0.770E-02	0.246E-02	0.210E-02	0.174E-02	0.175E-02	0.138E-02

PERTURBER DENSITY = 1.E+16cm^{-3}

TRANSITION	T(K)	ELECTRONS WIDTH(Å)	ELECTRONS SHIFT(Å)	PROTONS WIDTH(Å)	PROTONS SHIFT(Å)	IONIZED HELIUM WIDTH(Å)	IONIZED HELIUM SHIFT(Å)
6s2S-6p2Po1/2	2500.	0.144E-02	0.600E-03	0.956E-03	0.163E-03	0.952E-03	0.129E-03
Au I 2676.7 Å	5000.	0.167E-02	0.688E-03	0.958E-03	0.185E-03	0.955E-03	0.146E-03
C=0.12E+20	10000.	0.175E-02	0.700E-03	0.961E-03	0.209E-03	0.957E-03	0.166E-03
	20000.	0.191E-02	0.627E-03	0.964E-03	0.235E-03	0.959E-03	0.187E-03
	30000.	0.213E-02	0.496E-03	0.966E-03	0.251E-03	0.960E-03	0.200E-03
	50000.	0.259E-02	0.360E-03	0.970E-03	0.274E-03	0.962E-03	0.218E-03
6s2S-6p2Po3/2	2500.	0.164E-02	0.101E-02	0.104E-02	0.271E-03	0.103E-02	0.214E-03
Au I 2428.7 Å	5000.	0.192E-02	0.119E-02	0.105E-02	0.308E-03	0.104E-02	0.244E-03
C=0.79E+19	10000.	0.209E-02	0.132E-02	0.106E-02	0.349E-03	0.104E-02	0.277E-03
	20000.	0.230E-02	0.133E-02	0.107E-02	0.394E-03	0.105E-02	0.313E-03
	30000.	0.254E-02	0.134E-02	0.108E-02	0.422E-03	0.105E-02	0.336E-03
	50000.	0.295E-02	0.109E-02	0.109E-02	0.461E-03	0.106E-02	0.367E-03

Table 1. (continued)

PERTURBERS ARE:		ELECTRONS		PROTONS		IONIZED HELIUM	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
6s2S-7p2Po1/2	2500.	0.117E-01	0.820E-02	0.377E-02	0.193E-02	*0.348E-02	*0.147E-02
Au I 1665.8 Å	5000.	0.131E-01	0.949E-02	0.398E-02	0.231E-02	*0.365E-02	*0.179E-02
C=0.53E+18	10000.	0.145E-01	0.993E-02	0.421E-02	0.270E-02	0.381E-02	0.212E-02
	20000.	0.160E-01	0.916E-02	0.448E-02	0.310E-02	0.400E-02	0.245E-02
	30000.	0.171E-01	0.804E-02	0.466E-02	0.335E-02	0.412E-02	0.265E-02
	50000.	0.184E-01	0.671E-02	0.491E-02	0.368E-02	0.430E-02	0.292E-02
6s2S-7p2Po3/2	2500.	0.154E-01	0.111E-01	0.449E-02	0.253E-02	*0.403E-02	*0.190E-02
Au I 1646.7 Å	5000.	0.172E-01	0.124E-01	0.481E-02	0.306E-02	*0.429E-02	*0.236E-02
C=0.33E+18	10000.	0.187E-01	0.126E-01	0.516E-02	0.360E-02	0.454E-02	0.281E-02
	20000.	0.202E-01	0.113E-01	0.558E-02	0.416E-02	0.483E-02	0.327E-02
	30000.	0.212E-01	0.989E-02	0.586E-02	0.450E-02	0.503E-02	0.355E-02
	50000.	0.222E-01	0.824E-02	0.626E-02	0.494E-02	0.530E-02	0.391E-02
6s2S-8p2Po1/2	2500.	0.403E-01	0.272E-01	*0.114E-01	*0.534E-02		
Au I 1501.4 Å	5000.	0.453E-01	0.317E-01	*0.124E-01	*0.700E-02		
C=0.19E+18	10000.	0.501E-01	0.326E-01	*0.134E-01	*0.857E-02	*0.118E-01	*0.658E-02
	20000.	0.558E-01	0.277E-01	*0.144E-01	*0.101E-01	*0.126E-01	*0.789E-02
	30000.	0.600E-01	0.241E-01	*0.150E-01	*0.110E-01	*0.131E-01	*0.865E-02
	50000.	0.642E-01	0.200E-01	0.159E-01	0.122E-01	*0.137E-01	*0.964E-02
6s2S-8p2Po1/2	2500.	0.550E-01	0.369E-01				
Au I 1494.5 Å	5000.	0.604E-01	0.414E-01	*0.155E-01	*0.926E-02		
C=0.12E+18	10000.	0.651E-01	0.418E-01	*0.169E-01	*0.116E-01		
	20000.	0.705E-01	0.345E-01	*0.185E-01	*0.138E-01	*0.157E-01	*0.107E-01
	30000.	0.741E-01	0.296E-01	*0.195E-01	*0.151E-01	*0.164E-01	*0.118E-01
	50000.	0.770E-01	0.246E-01	*0.210E-01	*0.168E-01	*0.174E-01	*0.132E-01

PERTURBER DENSITY = 1.E+17cm^{-3}

TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
6s2S-6p2Po1/2	2500.	0.144E-01	0.590E-02	0.942E-02	0.153E-02	0.926E-02	0.119E-02
Au I 2676.7 Å	5000.	0.167E-01	0.681E-02	0.953E-02	0.178E-02	0.946E-02	0.140E-02
C=0.12E+21	10000.	0.175E-01	0.696E-02	0.959E-02	0.204E-02	0.953E-02	0.161E-02
	20000.	0.191E-01	0.625E-02	0.963E-02	0.231E-02	0.957E-02	0.183E-02
	30000.	0.213E-01	0.495E-02	0.966E-02	0.249E-02	0.959E-02	0.197E-02
	50000.	0.259E-01	0.360E-02	0.970E-02	0.272E-02	0.961E-02	0.216E-02
6s2S-6p2Po3/2	2500.	0.164E-01	0.984E-02	0.102E-01	0.248E-02	0.993E-02	0.191E-02
Au I 2428.7 Å	5000.	0.192E-01	0.118E-01	0.104E-01	0.292E-02	0.102E-01	0.228E-02
C=0.79E+20	10000.	0.209E-01	0.131E-01	0.105E-01	0.338E-02	0.104E-01	0.266E-02
	20000.	0.230E-01	0.132E-01	0.107E-01	0.386E-02	0.105E-01	0.305E-02
	30000.	0.254E-01	0.134E-01	0.108E-01	0.416E-02	0.105E-01	0.329E-02
	50000.	0.295E-01	0.109E-01	0.109E-01	0.456E-02	0.106E-01	0.362E-02
6s2S-7p2Po1/2	2500.	0.117	0.745E-01				
Au I 1665.8 Å	5000.	0.131	0.896E-01	*0.383E-01	*0.178E-01		
C=0.53E+19	10000.	0.145	0.954E-01	*0.416E-01	*0.232E-01		
	20000.	0.160	0.895E-01	*0.446E-01	*0.284E-01	*0.396E-01	*0.218E-01
	30000.	0.171	0.794E-01	*0.465E-01	*0.313E-01	*0.411E-01	*0.243E-01
	50000.	0.184	0.669E-01	*0.491E-01	*0.351E-01	*0.429E-01	*0.275E-01
6s2S-7p2Po3/2	2500.	0.153	0.986E-01				
Au I 1646.7 Å	5000.	0.172	0.116				
C=0.33E+19	10000.	0.187	0.120	*0.510E-01	*0.301E-01		
	20000.	0.202	0.109	*0.556E-01	*0.374E-01		
	30000.	0.212	0.973E-01	*0.585E-01	*0.415E-01	*0.500E-01	*0.321E-01
	50000.	0.222	0.821E-01	*0.625E-01	*0.468E-01	*0.529E-01	*0.365E-01
6s2S-8p2Po1/2	2500.	*0.401	*0.219				
Au I 1501.4 Å	5000.	0.452	0.279				
C=0.19E+19	10000.	0.501	0.297				
	20000.	0.558	0.259				
	30000.	0.600	0.230				
	50000.	0.642	0.196				

Table 1. (continued)

PERTURBERS ARE:		ELECTRONS		PROTONS		IONIZED HELIUM	
TRANSITION	T(K)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)	WIDTH(Å)	SHIFT(Å)
6s2S-8p2Po1/2	2500.	*0.545	*0.279				
Au I 1494.5 Å	5000.	*0.602	*0.350				
C=0.12E+19	10000.	0.649	0.369				
	20000.	0.704	0.315				
	30000.	0.740	0.278				
	50000.	0.769	0.239				
PERTURBER DENSITY = 1.E+18cm^{-3}							
6s2S-6p2Po1/2	2500.	0.144	0.561E-01	*0.810E-01	*0.124E-01	*0.676E-01	*0.903E-02
Au I 2676.7 Å	5000.	0.167	0.661E-01	*0.906E-01	*0.157E-01	*0.852E-01	*0.119E-01
C=0.12E+22	10000.	0.175	0.681E-01	0.942E-01	0.189E-01	*0.920E-01	*0.146E-01
	20000.	0.191	0.614E-01	0.957E-01	0.221E-01	*0.946E-01	*0.173E-01
	30000.	0.213	0.487E-01	0.963E-01	0.240E-01	0.953E-01	0.189E-01
	50000.	0.259	0.356E-01	0.968E-01	0.266E-01	0.958E-01	0.210E-01
6s2S-6p2Po3/2	2500.	0.163	0.913E-01	*0.835E-01	*0.178E-01	*0.657E-01	*0.121E-01
Au I 2428.7 Å	5000.	0.192	0.113	*0.974E-01	*0.243E-01	*0.892E-01	*0.179E-01
C=0.79E+21	10000.	0.209	0.128	*0.103	*0.303E-01	*0.990E-01	*0.231E-01
	20000.	0.230	0.130	0.106	0.361E-01	*0.103	*0.280E-01
	30000.	0.254	0.132	0.107	0.395E-01	*0.104	*0.309E-01
	50000.	0.295	0.108	0.109	0.440E-01	0.106	0.346E-01
6s2S-7p2Po1/2	2500.	*1.14	*0.497				
Au I 1665.8 Å	5000.	1.30	0.721				
C=0.53E+20	10000.	1.44	0.830				
	20000.	1.59	0.807				
	30000.	1.70	0.729				
	50000.	1.84	0.616				
6s2S-7p2Po3/2	2500.	*1.47	*0.581				
Au I 1646.7 Å	5000.	*1.69	*0.872				
C=0.33E+20	10000.	1.85	0.994				
	20000.	2.01	0.949				
	30000.	2.11	0.847				
	50000.	2.21	0.734				
6s2S-8p2Po1/2	2500.						
Au I 1501.4 Å	5000.						
C=0.19E+20	10000.	*4.69	*2.05				
	20000.	*5.37	*1.94				
	30000.	*5.82	*1.76				
	50000.	*6.29	*1.59				
6s2S-8p2Po1/2	2500.						
Au I 1494.5 Å	5000.						
C=0.12E+20	10000.						
	20000.	*6.45	*2.12				
	30000.	*6.92	*1.93				
	50000.	*7.32	*1.80				
PERTURBER DENSITY = 1.E+19cm^{-3}							
6s2S-6p2Po1/2	2500.	1.40	0.468				
Au I 2676.7 Å	5000.	1.66	0.595				
C=0.12E+23	10000.	1.75	0.634				
	20000.	1.91	0.581	*0.898	*0.188		
	30000.	2.13	0.459	*0.930	*0.214		
	50000.	2.59	0.336	*0.953	*0.245		
6s2S-6p2Po3/2	2500.	1.59	0.688				
Au I 2428.7 Å	5000.	1.90	0.966				
C=0.79E+22	10000.	2.09	1.16				
	20000.	2.30	1.22				
	30000.	2.54	1.25	*1.03	*0.331		
	50000.	2.95	1.03	*1.07	*0.390		
6s2S-7p2Po1/2	2500.						
Au I 1665.8 Å	5000.						
C=0.53E+21	10000.	*12.1	*4.30				
	20000.	*14.4	*5.20				
	30000.	*15.8	*4.90				
	50000.	*17.4	*4.60				

Table 2. This table shows electron-impact broadening parameters for Au II transitions, calculated within the modified semiempirical approach (Dimitrijević and Konjević 1980, Dimitrijević and Kršljanin 1986, Popović and Dimitrijević 1996) for a perturber density of 10^{16} cm^{-3} and temperatures from 5,000 up to 100,000 K. Transitions and averaged wavelengths for the multiplet ($\overline{\lambda}$ in nm) are also given. Stark broadening parameters for other perturber densities may be obtained by linear scaling, taking into account that for sufficiently higher densities a correction for Debye shielding effect (Griem 1974) should be applied.

Transition	T (K)	W (nm)	d (nm)
6s(3/2,1/2)-6p(3/2,1/2) $\overline{\lambda}$ = 201.58 nm	5000.	0.410E-02	-0.912E-03
	10000.	0.285E-02	-0.643E-03
	20000.	0.197E-02	-0.452E-03
	30000.	0.159E-02	-0.365E-03
	40000.	0.137E-02	-0.313E-03
	50000.	0.123E-02	-0.276E-03
6s(3/2,1/2)-6p(3/2,3/2) $\overline{\lambda}$ = 175.89 nm	5000.	0.330E-02	-0.623E-03
	10000.	0.229E-02	-0.435E-03
	20000.	0.159E-02	-0.300E-03
	30000.	0.128E-02	-0.237E-03
	40000.	0.111E-02	-0.198E-03
	50000.	0.100E-02	-0.169E-03
6s(5/2,1/2)-6p(5/2,1/2) $\overline{\lambda}$ = 208.04 nm	5000.	0.404E-02	-0.106E-02
	10000.	0.282E-02	-0.754E-03
	20000.	0.195E-02	-0.536E-03
	30000.	0.157E-02	-0.441E-03
	40000.	0.135E-02	-0.385E-03
	50000.	0.121E-02	-0.346E-03
6s(5/2,1/2)-6p(5/2,3/2) $\overline{\lambda}$ = 174.53 nm	5000.	0.308E-02	-0.658E-03
	10000.	0.215E-02	-0.464E-03
	20000.	0.149E-02	-0.326E-03
	30000.	0.120E-02	-0.264E-03
	40000.	0.103E-02	-0.226E-03
	50000.	0.927E-03	-0.199E-03
6p(3/2,1/2)-7s(3/2,1/2) $\overline{\lambda}$ = 235.45 nm	5000.	0.191E-01	0.816E-02
	10000.	0.133E-01	0.607E-02
	20000.	0.939E-02	0.478E-02
	30000.	0.792E-02	0.449E-02
	40000.	0.720E-02	0.451E-02
	50000.	0.679E-02	0.452E-02
6p(3/2,3/2)-7s(3/2,1/2) $\overline{\lambda}$ = 283.87 nm	5000.	0.282E-01	0.116E-01
	10000.	0.196E-01	0.860E-02
	20000.	0.139E-01	0.677E-02
	30000.	0.117E-01	0.638E-02
	40000.	0.106E-01	0.642E-02
	50000.	0.100E-01	0.642E-02
6p(5/2,1/2)-7s(5/2,1/2) $\overline{\lambda}$ = 226.38 nm	5000.	0.147E-01	0.387E-02
	10000.	0.103E-01	0.284E-02
	20000.	0.719E-02	0.218E-02
	30000.	0.594E-02	0.200E-02
	40000.	0.528E-02	0.197E-02
	50000.	0.487E-02	0.194E-02

Table 2. (continued)

Transition	T (K)	W (nm)	d (nm)
6p(5/2,3/2)-7s(5/2,1/2) $\overline{\lambda} = 286.18$ nm	5000.	0.241E-01	0.585E-02
	10000.	0.168E-01	0.430E-02
	20000.	0.118E-01	0.330E-02
	30000.	0.974E-02	0.304E-02
	40000.	0.865E-02	0.299E-02
	50000.	0.798E-02	0.295E-02

volume (V) multiplied by the perturber density (N) is much less than one and the impact approximation is valid (Sahal-Bréchot, 1969ab). Values for NV > 0.5 are not given and values for 0.1 < NV ≤ 0.5 are denoted by an asterisk. Stark broadening parameters for densities lower 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 and 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 formula for such a case is given. The accuracy of the results obtained decreases when broadening by ion interactions becomes important.

The analysis of present results will be published elsewhere (Popović *et al*. 1999).

Acknowledgements – This work is a part of the project "Astrometrical, Astrodynamical and Astrophysical Investigations", supported by Ministry of Science and Technology of Serbia.

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ТАБЕЛЕ ПАРАМЕТАРА ШТАРКОВОГ ШИРЕЊА СПЕКТРАЛНИХ ЛИНИЈА Au I И Au 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 шест линија Au I. Резултати су дати у функцији температуре и концентрације пертурбера. Поред тога, користећи модификовани семиемпиријски прилаз, израчунате су ширине и помераји спектралних линија, проузроковани сударима са електронима, за осам прелаза у спектру Au II.