Table 4. Ionization thresholds and strongest lines of atoms and ions

Species	Z	N	Configuration	E, eV	The strongest resonance line λ, Å	g_i	g_k	f_{ik}	P
HI	1	1	$1s(2S_{1/2})$	13.599	1215.6701	2	6	0.416	14.70
HeI	2	2	$1s^2(1S_0)$	24.588	584.3340	1	3	0.285	13.21
HeII	2	1	$1s(2S_{1/2})$	54.418	303.7822	2	6	0.416	13.09
LiI	3	3	$1s^22s(2S_{1/2})$	5.392	6709.613	2	4	0.499	6.83
LiII	3	2	$1s^2(1S_0)$	75.641	199.282	1	3	0.462	5.27
LiIII	3	1	$1s(2S_{1/2})$	122.455	134.998	2	6	0.416	5.06
BeI	4	4	$1s^22s^2(1S_0)$	9.323	2349.329	1	3	1.39	4.93
BeII	4	3	$1s^22s(2S_{1/2})$	18.211	3131.327	2	4	0.333	4.44
BeIII	4	2	$1s^2(1S_0)$	153.896	100.2552	1	3	0.555	3.17
BeIV	4	1	$1s(2S_{1/2})$	217.720	75.928	2	6	0.416	2.92
BI	5	5	$1s^22s^22p(2P^\circ_{1/2})$	8.298	1378.875	2	2	0.390	5.61
BII	5	4	$1s^22s^2(1S_0)$	25.155	1362.461	1	3	1.01	6.02
BIII	5	3	$1s^22s(2S_{1/2})$	37.931	2066.436	2	4	0.243	5.58
BIV	5	2	$1s^2(1S_0)$	259.377	60.3144	1	3	0.611	4.45
BV	5	1	$1s(2S_{1/2})$	340.229	48.588	2	6	0.416	4.19
CI	6	6	$1s^22s^22p^2(3P_0)$	11.260	1656.9283	1	3	0.148	10.95
CII	6	5	$1s^22s^22p(2P^\circ_{1/2})$	24.384	903.9616	2	2	0.336	11.04
CIII	6	4	$1s^22s^2(1S_0)$	47.888	977.020	1	3	0.767	11.43
CIV	6	3	$1s^22s(2S_{1/2})$	64.494	1548.195	2	4	0.190	11.03
CV	6	2	$1s^2(1S_0)$	392.090	40.2680	1	3	0.648	9.98
CVI	6	1	$1s(2S_{1/2})$	489.997	33.736	2	6	0.416	9.71
NI	7	7	$1s^22s^22p^3(4S^\circ_{3/2})$	14.534	1199.5496	4	6	0.163	10.34
NII	7	6	$1s^22s^22p^2(3P_0)$	29.602	533.5099	1	3	0.299	10.25
NIII	7	5	$1s^22s^22p(2P^\circ_{1/2})$	47.450	685.513	2	2	0.268	10.31
NIV	7	4	$1s^22s^2(1S_0)$	77.474	765.148	1	3	0.616	10.72
NV	7	3	$1s^22s(2S_{1/2})$	97.891	1238.821	2	4	0.157	10.34
NVI	7	2	$1s^2(1S_0)$	552.074	28.787	1	3	0.675	9.34
NVII	7	1	$1s(2S_{1/2})$	667.051	24.781	2	6	0.416	9.06
OI	8	8	$1s^22s^22p^4(3P_2)$	13.618	1302.1685	5	3	0.0504	10.75
OII	8	7	$1s^22s^22p^3(4S^\circ_{3/2})$	35.118	834.4655	4	6	0.132	10.97
OIII	8	6	$1s^22s^22p^2(3P_0)$	54.936	305.596	1	3	0.470	11.09
OIV	8	5	$1s^22s^22p(2P^\circ_{1/2})$	77.414	554.075	2	2	0.224	11.02
OV	8	4	$1s^22s^2(1S_0)$	113.900	629.730	1	3	0.515	11.44
OVI	8	3	$1s^22s(2S_{1/2})$	138.121	1031.9261	2	4	0.133	11.07
OVII	8	2	$1s^2(1S_0)$	739.338	21.6020	1	3	0.696	10.11
OVIII	8	1	$1s(2S_{1/2})$	871.417	18.969	2	6	0.416	9.83
FI	9	9	$1s^22s^22p^5(2P^\circ_{3/2})$	17.423	954.826	4	4	0.0789	6.36
FII	9	8	$1s^22s^22p^4(3P_2)$	34.971	606.804	5	5	0.132	6.38
FIII	9	7	$1s^22s^22p^3(4S^\circ_{3/2})$	62.709	255.863	4	6	0.338	6.42
FIV	9	6	$1s^22s^22p^2(3P_0)$	87.141	201.011	1	3	0.589	6.55
FV	9	5	$1s^22s^22p(2P^\circ_{1/2})$	114.24	165.983	2	4	0.544	6.44
FVI	9	4	$1s^22s^2(1S_0)$	157.166	535.207	1	3	0.443	6.85
FVII	9	3	$1s^22s(2S_{1/2})$	185.188	883.110	2	4	0.115	6.49
FVIII	9	2	$1s^2(1S_0)$	953.915	16.807	1	3	0.711	5.56
FIX	9	1	$1s(2S_{1/2})$	1103.126	14.984	2	6	0.416	5.27

Table 4. Ionization thresholds and strongest lines of atoms and ions

Species	Z	N	Configuration	E, eV	The strongest resonance line λ, Å	g_i	g_k	f_{ik}	P
NeI	10	10	$1s^22s^22p^6(1\mathrm{S}_0)$	21.565	735.8962	1	3	0.149	10.13
NeII	10	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	40.964	446.2556	4	4	0.0974	9.73
NeIII	10	8	$1s^22s^22p^4(3\mathrm{P}_2)$	63.46	489.505	5	5	0.131	9.90
NeIV	10	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	97.12	172.62	4	6	0.463	9.99
NeV	10	6	$1s^22s^22p^2(3\mathrm{P}_0)$	126.22	143.22	1	3	0.673	10.07
NeVI	10	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	157.93	122.49	2	4	0.572	9.94
NeVII	10	4	$1s^22s^2(1\mathrm{S}_0)$	207.28	465.221	1	3	0.389	10.35
NeVIII	10	3	$1s^22s(2\mathrm{S}_{1/2})$	239.10	770.409	2	4	0.103	9.99
NeIX	10	2	$1s^2(1\mathrm{S}_0)$	1195.83	13.447	1	3	0.724	9.08
NeX	10	1	$1s(2\mathrm{S}_{1/2})$	1362.2	12.134	2	6	0.416	8.79
NaI	11	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	5.139	5891.5833	2	4	0.670	9.91
NaII	11	10	$1s^22s^22p^6(1\mathrm{S}_0)$	47.287	372.075	1	3	0.212	8.21
NaIII	11	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	71.620	215.340	4	6	0.207	7.96
NaIV	11	8	$1s^22s^22p^4(3\mathrm{P}_2)$	98.92	410.3715	5	5	0.126	8.02
NaV	11	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	138.39	125.286	4	6	0.557	8.15
NaVI	11	6	$1s^22s^22p^2(3\mathrm{P}_0)$	172.15	107.553	1	3	0.736	8.21
NaVII	11	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	208.48	94.288	2	4	0.592	8.06
NaVIII	11	4	$1s^22s^2(1\mathrm{S}_0)$	264.19	411.145	1	3	0.348	8.47
NaIX	11	3	$1s^22s(2\mathrm{S}_{1/2})$	299.88	681.72	2	4	0.0924	8.11
NaX	11	2	$1s^2(1\mathrm{S}_0)$	1465.13	11.0027	1	3	0.734	7.22
NaXI	11	1	$1s(2\mathrm{S}_{1/2})$	1648.71	10.025	2	6	0.416	6.93
MgI	12	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	7.646	2852.9642	1	3	1.73	11.27
MgII	12	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	15.035	2796.352	2	4	0.629	10.83
MgIII	12	10	$1s^22s^22p^6(1\mathrm{S}_0)$	80.144	186.5149	1	3	0.474	9.53
MgIV	12	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	109.25	146.954	4	6	0.295	9.22
MgV	12	8	$1s^22s^22p^4(3\mathrm{P}_2)$	141.27	353.091	5	5	0.118	9.20
MgVI	12	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	186.51	95.483	4	6	0.629	9.36
MgVII	12	6	$1s^22s^22p^2(3\mathrm{P}_0)$	224.95	83.910	1	3	0.778	9.39
MgVIII	12	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	265.96	74.858	2	4	0.607	9.24
MgIX	12	4	$1s^22s^2(1\mathrm{S}_0)$	328.24	368.071	1	3	0.314	9.64
MgX	12	3	$1s^22s(2\mathrm{S}_{1/2})$	367.54	609.79	2	4	0.0842	9.29
MgXI	12	2	$1s^2(1\mathrm{S}_0)$	1761.85	9.1685	1	3	0.742	8.41
MgXII	12	1	$1s(2\mathrm{S}_{1/2})$	1962.68	8.421	2	6	0.416	8.12
AlI	13	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	5.986	1765.632	2	2	0.531	9.45
AlII	13	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	18.829	1670.7874	1	3	1.81	9.96
AlIII	13	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	28.448	1854.7164	2	4	0.575	9.51
AlIV	13	10	$1s^22s^22p^6(1\mathrm{S}_0)$	119.99	129.730	1	3	0.778	8.48
AlV	13	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	153.826	107.948	4	6	0.352	8.06
AlVI	13	8	$1s^22s^22p^4(3\mathrm{P}_2)$	190.48	309.597	5	5	0.112	8.02
AlVII	13	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	241.44	75.367	4	6	0.719	8.21
AlVIII	13	6	$1s^22s^22p^2(3\mathrm{P}_0)$	284.60	67.360	1	3	0.812	8.22
AlIX	13	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	330.11	60.896	2	4	0.619	8.06
AlX	13	4	$1s^22s^2(1\mathrm{S}_0)$	399.37	332.783	1	3	0.287	8.46
AlXI	13	3	$1s^22s(2\mathrm{S}_{1/2})$	442.08	550.03	2	4	0.0773	8.11
AlXII	13	2	$1s^2(1\mathrm{S}_0)$	2086.04	7.7571	1	3	0.750	7.24
AlXIII	13	1	$1s(2\mathrm{S}_{1/2})$	2304.16	7.173	2	6	0.416	6.95
SiI	14	14	$1s^22s^22p^63s^23p^2(3\mathrm{P}_0)$	8.152	2515.0725	1	3	0.236	10.32
SiII	14	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	16.346	1260.4221	2	4	1.18	10.72
SiIII	14	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	33.493	1206.500	1	3	1.68	10.86

Table 4. Ionization thresholds and strongest lines of atoms and ions

Species	Z	N	Configuration	E, eV	The strongest resonance line λ, Å	g_i	g_k	f_{ik}	P
Si IV	14	11	$1s^22s^22p^63s(2S_{1/2})$	45.142	1393.755	2	4	0.524	10.41
Si V	14	10	$1s^22s^22p^6(1S_0)$	166.77	96.442	1	3	1.08	9.57
Si VI	14	9	$1s^22s^22p^5(2P^{\circ}_{3/2})$	205.06	83.128	4	6	0.381	9.05
Si VII	14	8	$1s^22s^22p^4(3P_2)$	246.53	275.352	5	5	0.106	9.01
Si VIII	14	7	$1s^22s^22p^3(4S^{\circ}_{3/2})$	303.18	61.070	4	6	0.764	9.22
Si IX	14	6	$1s^22s^22p^2(3P_0)$	351.11	55.305	1	3	0.840	9.22
Si X	14	5	$1s^22s^22p(2P^{\circ}_{1/2})$	401.38	50.524	2	4	0.628	9.05
Si XI	14	4	$1s^22s^2(1S_0)$	476.08	303.318	1	3	0.265	9.45
Si XII	14	3	$1s^22s(2S_{1/2})$	523.52	499.40	2	4	0.0719	9.11
Si XIII	14	2	$1s^2(1S_0)$	2437.74	6.6477	1	3	0.757	8.25
Si XIV	14	1	$1s(2S_{1/2})$	2673.20	6.182	2	6	0.416	7.96
P I	15	15	$1s^22s^22p^63s^23p^3(4S^{\circ}_{3/2})$	10.49	1774.9487	4	6	0.154	8.01
P II	15	14	$1s^22s^22p^63s^23p^2(3P_0)$	19.73	963.801	1	3	1.46	8.72
P III	15	13	$1s^22s^22p^63s^23p(2P^{\circ}_{1/2})$	30.204	917.118	2	2	0.405	8.14
P IV	15	12	$1s^22s^22p^63s^2(1S_0)$	51.444	950.657	1	3	1.16	8.61
P V	15	11	$1s^22s^22p^63s(2S_{1/2})$	65.026	1117.977	2	4	0.473	8.29
P VI	15	10	$1s^22s^22p^6(1S_0)$	220.434	74.951	1	3	1.2	7.52
P VII	15	9	$1s^22s^22p^5(2P^{\circ}_{3/2})$	263.23	219.91	4	2	0.106	6.94
P VIII	15	8	$1s^22s^22p^4(3P_2)$	309.42	247.65	5	5	0.129	7.07
P IX	15	7	$1s^22s^22p^3(4S^{\circ}_{3/2})$	371.74	289.49	4	6	0.101	7.04
P X	15	6	$1s^22s^22p^2(3P_0)$	424.51	309.20	1	3	0.089	7.01
P XI	15	5	$1s^22s^22p(2P^{\circ}_{1/2})$	479.59	315.65	2	4	0.0731	6.93
P XII	15	4	$1s^22s^2(1S_0)$	560.43	278.26	1	3	0.251	7.41
P XIII	15	3	$1s^22s(2S_{1/2})$	611.9	455.67	2	4	0.068	7.06
P XIV	15	2	$1s^2(1S_0)$	2817.02	4.918	1	3	0.749	6.14
P XV	15	1	$1s(2S_{1/2})$	3069.86	5.383	2	6	0.416	5.92
S I	16	16	$1s^22s^22p^63s^23p^4(3P_2)$	10.360	1425.0299	5	7	0.121	9.51
S II	16	15	$1s^22s^22p^63s^23p^3(4S^{\circ}_{3/2})$	23.33	765.693	4	6	1.19	10.23
S III	16	14	$1s^22s^22p^63s^23p^2(3P_0)$	34.83	677.746	1	3	1.64	10.32
S IV	16	13	$1s^22s^22p^63s^23p(2P^{\circ}_{1/2})$	47.305	657.34	2	4	1.18	10.16
S V	16	12	$1s^22s^22p^63s^2(1S_0)$	[72.68]	786.48	1	3	1.42	10.32
S VI	16	11	$1s^22s^22p^63s(2S_{1/2})$	88.054	933.378	2	4	0.445	9.89
S VII	16	10	$1s^22s^22p^6(1S_0)$	280.94	60.161	1	3	1.60	9.25
S VIII	16	9	$1s^22s^22p^5(2P^{\circ}_{3/2})$	328.24	52.756	4	6	0.496	8.69
S IX	16	8	$1s^22s^22p^4(3P_2)$	379.11	224.77	5	5	0.0949	8.60
S X	16	7	$1s^22s^22p^3(4S^{\circ}_{3/2})$	447.10	42.543	4	6	0.827	8.82
S XI	16	6	$1s^22s^22p^2(3P_0)$	504.79	39.025	1	3	0.885	8.81
S XII	16	5	$1s^22s^22p(2P^{\circ}_{1/2})$	564.67	36.398	2	4	0.643	8.64
S XIII	16	4	$1s^22s^2(1S_0)$	651.65	256.66	1	3	0.230	9.04
S XIV	16	3	$1s^22s(2S_{1/2})$	707.16	417.61	2	4	0.0639	8.70
S XV	16	2	$1s^2(1S_0)$	3223.92	5.0385	1	3	0.768	7.86
S XVI	16	1	$1s(2S_{1/2})$	3494.21	4.729	2	6	0.416	7.56
Cl I	17	17	$1s^22s^22p^63s^23p^5(2P^{\circ}_{3/2})$	12.968	1347.2396	4	4	0.119	7.47
Cl II	17	16	$1s^22s^22p^63s^23p^4(3P_2)$	23.814	1071.0358	5	5	0.015	6.48
Cl III	17	15	$1s^22s^22p^63s^23p^3(4S^{\circ}_{3/2})$	39.61	1015.0249	4	6	0.0213	6.60
Cl IV	17	14	$1s^22s^22p^63s^23p^2(3P_0)$	53.466	973.1877	1	3	0.0444	6.91
Cl V	17	13	$1s^22s^22p^63s^23p(2P^{\circ}_{1/2})$	67.8	883.125	2	4	0.53	7.94
Cl VI	17	12	$1s^22s^22p^63s^2(1S_0)$	[97.03]	671.3580	1	3	1.28	8.20
Cl VII	17	11	$1s^22s^22p^63s(2S_{1/2})$	114.197	800.641	2	4	0.418	7.79
Cl VIII	17	10	$1s^22s^22p^6(1S_0)$	348.29	50.074	1	3	1.6	7.17

Table 4. Ionization thresholds and strongest lines of atoms and ions

Species	Z	N	Configuration	E, eV	The strongest resonance line λ, Å	g_i	g_k	f_{ik}	P
ClIX	17	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	400.06	180.71	4	2	0.0914	6.49
ClX	17	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	455.63	205.40	5	5	0.112	6.63
ClXI	17	7	$1s^2 2s^2 2p^3 (4\mathrm{S}^\circ_{3/2})$	529.28	242.76	4	6	0.0878	6.60
ClXII	17	6	$1s^2 2s^2 2p^2 (3\mathrm{P}_0)$	591.99	257.43	1	3	0.0848	6.61
ClXIII	17	5	$1s^2 2s^2 2p (2\mathrm{P}^\circ_{1/2})$	656.71	264.78	2	4	0.067	6.52
ClXIV	17	4	$1s^2 2s^2 (1\mathrm{S}_0)$	749.76	237.70	1	3	0.221	6.99
ClXV	17	3	$1s^2 2s (2\mathrm{S}_{1/2})$	809.41	383.96	2	4	0.0609	6.64
ClXVI	17	2	$1s^2 (1\mathrm{S}_0)$	3658.51	4.4442	1	3	0.751	5.79
ClXVII	17	1	$1s (2\mathrm{S}_{1/2})$	3946.32	4.187	2	6	0.416	5.51
ArI	18	18	$1s^2 2s^2 2p^6 3s^2 3p^6 (1\mathrm{S}_0)$	15.760	1048.2199	1	3	0.244	8.97
ArII	18	17	$1s^2 2s^2 2p^6 3s^2 3p^5 (2\mathrm{P}^\circ_{3/2})$	27.630	580.2631	4	6	0.493	9.02
ArIII	18	16	$1s^2 2s^2 2p^6 3s^2 3p^4 (3\mathrm{P}_2)$	40.74	476.436	5	7	1.50	9.41
ArIV	18	15	$1s^2 2s^2 2p^6 3s^2 3p^3 (4\mathrm{S}^\circ_{3/2})$	59.81	452.91	4	6	1.56	9.41
ArV	18	14	$1s^2 2s^2 2p^6 3s^2 3p^2 (3\mathrm{P}_0)$	75.02	445.997	1	3	1.40	9.35
ArVI	18	13	$1s^2 2s^2 2p^6 3s^2 3p (2\mathrm{P}^\circ_{1/2})$	91.010	457.48	2	4	0.942	9.19
ArVII	18	12	$1s^2 2s^2 2p^6 3s^2 (1\mathrm{S}_0)$	124.324	585.75	1	3	1.24	9.42
ArVIII	18	11	$1s^2 2s^2 2p^6 3s (2\mathrm{S}_{1/2})$	143.458	700.245	2	4	0.385	8.99
ArIX	18	10	$1s^2 2s^2 2p^6 (1\mathrm{S}_0)$	422.45	41.48	1	3	2.01	8.48
ArX	18	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	478.69	37.43	4	6	0.652	7.95
ArXI	18	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	538.96	188.82	5	5	0.0868	7.77
ArXII	18	7	$1s^2 2s^2 2p^3 (4\mathrm{S}^\circ_{3/2})$	618.26	31.388	4	6	0.868	8.00
ArXIII	18	6	$1s^2 2s^2 2p^2 (3\mathrm{P}_0)$	686.11	[29.4]	1	3	0.906	7.99
ArXIV	18	5	$1s^2 2s^2 2p (2\mathrm{P}^\circ_{1/2})$	755.75	27.47	2	4	0.654	7.81
ArXV	18	4	$1s^2 2s^2 (1\mathrm{S}_0)$	854.78	221.15	1	3	0.205	8.22
ArXVI	18	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[918.04]	353.92	2	4	0.0579	7.87
ArXVII	18	2	$1s^2 (1\mathrm{S}_0)$	4120.87	3.9488	1	3	0.775	7.05
ArXVIII	18	1	$1s (2\mathrm{S}_{1/2})$	4426.24	3.733	2	6	0.416	6.75
KI	19	19	$..2s^2 2p^6 3s^2 3p^6 4s (2\mathrm{S}_{1/2})$	4.34069	7667.021	2	4	0.682	8.85
KII	19	18	$1s^2 2s^2 2p^6 3s^2 3p^6 (1\mathrm{S}_0)$	31.63	607.931	1	3	0.00022	4.25
KIII	19	17	$1s^2 2s^2 2p^6 3s^2 3p^5 (2\mathrm{P}^\circ_{3/2})$	45.806	765.644	4	2	0.22	7.36
KIV	19	16	$1s^2 2s^2 2p^6 3s^2 3p^4 (3\mathrm{P}_2)$	60.91	745.258	5	5	0.53	7.73
KV	19	15	$1s^2 2s^2 2p^6 3s^2 3p^3 (4\mathrm{S}^\circ_{3/2})$	[82.66]	731.869	4	6	0.48	7.68
KVI	19	14	$1s^2 2s^2 2p^6 3s^2 3p^2 (3\mathrm{P}_0)$	99.4	710.526	1	3	0.47	7.65
KVII	19	13	$1s^2 2s^2 2p^6 3s^2 3p (2\mathrm{P}^\circ_{1/2})$	117.56	658.398	2	4	0.44	7.59
KVIII	19	12	$1s^2 2s^2 2p^6 3s^2 (1\mathrm{S}_0)$	154.71	519.382	1	3	1.14	7.90
KIX	19	11	$1s^2 2s^2 2p^6 3s (2\mathrm{S}_{1/2})$	175.818	621.452	2	4	0.362	7.48
KX	19	10	$1s^2 2s^2 2p^6 (1\mathrm{S}_0)$	503.8	35.779	1	3	1.9	6.96
KXI	19	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	564.7	152.462	4	2	0.081	6.22
KXII	19	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[629.4]	174.412	5	5	0.0979	6.36
KXIII	19	7	$1s^2 2s^2 2p^3 (4\mathrm{S}^\circ_{3/2})$	[714.6]	208.106	4	6	0.0775	6.34
KXIV	19	6	$1s^2 2s^2 2p^2 (3\mathrm{P}_0)$	[786.6]	217.615	1	3	0.0836	6.39
KXV	19	5	$1s^2 2s^2 2p (2\mathrm{P}^\circ_{1/2})$	[861.6]	180.878	2	2	0.0762	6.27
KXVI	19	4	$1s^2 2s^2 (1\mathrm{S}_0)$	[968]	206.251	1	3	0.199	6.74
KXVII	19	3	$1s^2 2s (2\mathrm{S}_{1/2})$	1033.4	326.777	2	4	0.0558	6.39
KXVIII	19	2	$1s^2 (1\mathrm{S}_0)$	4611.06	3.5316	1	3	0.748	5.55
KXIX	19	1	$1s (2\mathrm{S}_{1/2})$	4934.07	3.349	2	6	0.416	5.27
CaI	20	20	$..2s^2 2p^6 3s^2 3p^6 4s^2 (1\mathrm{S}_0)$	6.11321	4227.918	1	3	1.94	10.25
CaII	20	19	$..2s^2 2p^6 3s^2 3p^6 4s (2\mathrm{S}_{1/2})$	11.87181	3934.777	2	4	0.650	9.75
CaIII	20	18	$1s^2 2s^2 2p^6 3s^2 3p^6 (1\mathrm{S}_0)$	50.9135	357.969	1	3	3.83	9.48
CaIV	20	17	$1s^2 2s^2 2p^6 3s^2 3p^5 (2\mathrm{P}^\circ_{3/2})$	67.27	318.094	4	6	1.42	8.99

Table 4. Ionization thresholds and strongest lines of atoms and ions

					The strongest resonance line				
Species	Z	N	Configuration	E, eV	λ, Å	g_i	g_k	f_{ik}	P
Ca V	20	16	$1s^22s^22p^63s^23p^4(3\mathrm{P}_2)$	84.50	[314]	5	7	1.64	9.05
Ca VI	20	15	$1s^22s^22p^63s^23p^3(4\mathrm{S}^\circ_{3/2})$	[108.78]	335.33	4	6	1.24	8.96
Ca VII	20	14	$1s^22s^22p^63s^23p^2(3\mathrm{P}_0)$	127.2	338.824	1	3	1.14	8.93
Ca VIII	20	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	147.24	354.165	2	4	0.768	8.77
Ca IX	20	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	188.3	466.240	1	3	1.09	9.05
Ca X	20	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	211.277	557.763	2	4	0.343	8.62
Ca XI	20	10	$1s^22s^22p^6(1\mathrm{S}_0)$	591.9	30.448	1	3	2.34	8.19
Ca XII	20	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	[657.2]	27.973	4	6	0.769	7.67
Ca XIII	20	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[726.6]	161.747	5	5	0.0798	7.45
Ca XIV	20	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	[817.6]	24.110	4	6	0.896	7.67
Ca XV	20	6	$1s^22s^22p^2(3\mathrm{P}_0)$	[894.5]	22.725	1	3	0.928	7.66
Ca XVI	20	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	[974]	[21.6]	2	4	0.657	7.49
Ca XVII	20	4	$1s^22s^2(1\mathrm{S}_0)$	[1087]	192.858	1	3	0.185	7.89
Ca XVIII	20	3	$1s^22s(2\mathrm{S}_{1/2})$	1157.0	302.215	2	4	0.0538	7.55
Ca XIX	20	2	$1s^2(1\mathrm{S}_0)$	5129.16	3.1769	1	3	0.782	6.74
Ca XX	20	1	$1s(2\mathrm{S}_{1/2})$	5469.88	3.020	2	6	0.416	6.44
Sc I	21	21	$..2p^63s^23p^63d4s^2(2\mathrm{D}_{3/2})$	6.56154	3908.595	4	6	0.57	6.44
Sc II	21	20	$..2p^63s^23p^63d4s(3\mathrm{D}_1)$	12.79987	3643.822	3	5	0.375	6.23
Sc III	21	19	$..2s^22p^63s^23p^63d(2\mathrm{D}_{3/2})$	24.75704	1610.194	4	2	0.0866	5.23
Sc IV	21	18	$1s^22s^22p^63s^23p^6(1\mathrm{S}_0)$	73.4900	289.851	1	3	3.92	6.15
Sc V	21	17	$1s^22s^22p^63s^23p^5(2\mathrm{P}^\circ_{3/2})$	[91.9]	283.913	4	6	1.8	5.80
Sc VII	21	15	$1s^22s^22p^63s^23p^3(4\mathrm{S}^\circ_{3/2})$	[138.0]	298.557	4	6	1.1	5.61
Sc VIII	21	14	$1s^22s^22p^63s^23p^2(3\mathrm{P}_0)$	158.1	555.672	1	3	0.055	4.58
Sc IX	21	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	180.02	318.615	2	4	0.67	5.42
Sc X	21	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	225.1	422.850	1	3	1.05	5.74
Sc XI	21	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	249.837	505.108	2	4	0.337	5.32
Sc XII	21	10	$1s^22s^22p^6(1\mathrm{S}_0)$	687.36	26.544	1	3	2.5	4.91
Sc XIII	21	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	[756.7]	130.952	4	2	0.0732	4.07
Sc XIV	21	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[830.8]	150.490	5	5	0.087	4.21
Sc XV	21	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	[927.5]	181.165	4	6	0.069	4.19
Sc XVI	21	6	$1s^22s^22p^2(3\mathrm{P}_0)$	[1009]	185.972	1	3	0.085	4.29
Sc XVII	21	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	[1094]	158.136	2	2	0.083	4.21
Sc XVIII	21	4	$1s^22s^2(1\mathrm{S}_0)$	[1213]	180.703	1	3	0.182	4.61
Sc XIX	21	3	$1s^22s(2\mathrm{S}_{1/2})$	1288.0	279.817	2	4	0.0523	4.26
Sc XX	21	2	$1s^2(1\mathrm{S}_0)$	5675.26	2.8728	1	3	0.741	3.42
Sc XXI	21	1	$1s(2\mathrm{S}_{1/2})$	6033.769	2.738	2	6	0.416	3.15
Ti I	22	22	$..2p^63s^23p^63d^24s^2(3\mathrm{F}_2)$	6.82	3636.498	5	7	0.223	7.84
Ti II	22	21	$..2p^63s^23p^63d^24s(4\mathrm{F}_{3/2})$	13.58	3384.740	4	6	0.34	7.99
Ti III	22	20	$..2s^22p^63s^23p^63d^2(3\mathrm{F}_2)$	27.4919	1298.697	5	3	0.0951	7.02
Ti IV	22	19	$..2s^22p^63s^23p^63d(2\mathrm{D}_{3/2})$	43.2675	423.487	4	6	0.198	6.85
Ti V	22	18	$1s^22s^22p^63s^23p^6(1\mathrm{S}_0)$	99.300	252.958	1	3	3.63	7.89
Ti VI	22	17	$1s^22s^22p^63s^23p^5(2\mathrm{P}^\circ_{3/2})$	119.53	250.482	4	6	1.7	7.56
Ti VIII	22	15	$1s^22s^22p^63s^23p^3(4\mathrm{S}^\circ_{3/2})$	[170.4]	269.533	4	6	0.98	7.35
Ti IX	22	14	$1s^22s^22p^63s^23p^2(3\mathrm{P}_0)$	192.1	274.411	1	3	0.9	7.32
Ti X	22	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	215.9	289.579	2	4	0.629	7.19
Ti XI	22	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	265.0	386.140	1	3	0.992	7.51
Ti XII	22	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	291.502	460.741	2	4	0.32	7.10
Ti XIII	22	10	$1s^22s^22p^6(1\mathrm{S}_0)$	787.84	23.356	1	3	2.5	6.70
Ti XIV	22	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	[863.1]	121.986	4	2	0.0699	5.86
Ti XV	22	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[941.9]	140.395	5	5	0.082	5.99
Ti XVI	22	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	[1044]	169.740	4	6	0.066	5.98

Table 4. Ionization thresholds and strongest lines of atoms and ions

					The strongest resonance line				
Species	Z	N	Configuration	E, eV	λ, Å	g_i	g_k	f_{ik}	P
Ti XVII	22	6	$1s^22s^22p^2(3\mathrm{P}_0)$	[1131]	172.380	1	3	0.086	6.10
Ti XVIII	22	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	[1221]	179.902	2	4	0.061	5.97
Ti XIX	22	4	$1s^22s^2(1\mathrm{S}_0)$	[1346]	169.590	1	3	0.175	6.40
Ti XX	22	3	$1s^22s(2\mathrm{S}_{1/2})$	1425.3	259.296	2	4	0.0509	6.05
Ti XXI	22	2	$1s^2(1\mathrm{S}_0)$	6249.2	2.6101	1	3	0.735	5.21
Ti XXII	22	1	$1s(2\mathrm{S}_{1/2})$	6625.82	2.493	2	6	0.416	4.95
V I	23	23	$..2p^63s^23p^63d^34s^2(4\mathrm{F}_{3/2})$	6.740	3184.933	4	6	0.547	7.26
V II	23	22	$..2s^22p^63s^23p^63d^4(5\mathrm{D}_0)$	14.66	2740.525	1	3	0.102	6.47
V III	23	21	$..2s^22p^63s^23p^63d^3(4\mathrm{F}_{3/2})$	29.311	1153.179	4	4	0.103	6.09
V IV	23	20	$..2s^22p^63s^23p^63d^2(3\mathrm{F}_2)$	46.709	682.923	5	5	0.0482	5.54
V V	23	19	$..2s^22p^63s^23p^63d(2\mathrm{D}_{3/2})$	65.2822	228.301	4	2	0.67	6.20
V VI	23	18	$1s^22s^22p^63s^23p^6(1\mathrm{S}_0)$	128.13	179.330	1	3	0.31	5.77
V VII	23	17	$1s^22s^22p^63s^23p^5(2\mathrm{P}^\circ_{3/2})$	[150.6]	225.16	4	6	1.56	6.57
V VIII	23	16	$1s^22s^22p^63s^23p^4(3\mathrm{P}_2)$	[173.4]	240.22	5	5	0.72	6.26
V IX	23	15	$1s^22s^22p^63s^23p^3(4\mathrm{S}^\circ_{3/2})$	[205.8]	244.89	4	6	0.9	6.36
V X	23	14	$1s^22s^22p^63s^23p^2(3\mathrm{P}_0)$	[230.5]	452.522	1	3	0.061	5.46
V XI	23	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	[255.7]	265.31	2	4	0.57	6.20
V XII	23	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	308.1	355.11	1	3	0.947	6.55
V XIII	23	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	336.28	422.785	2	4	0.305	6.13
V XIV	23	10	$1s^22s^22p^6(1\mathrm{S}_0)$	896.0	20.716	1	3	2.51	5.74
V XV	23	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	[976]	113.930	4	2	0.0671	4.90
V XVI	23	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[1060]	131.263	5	5	0.078	5.03
V XVII	23	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	[1168]	159.347	4	6	0.062	5.01
V XVIII	23	6	$1s^22s^22p^2(3\mathrm{P}_0)$	[1260]	159.991	1	3	0.087	5.16
V XIX	23	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	[1355]	167.34	2	4	0.061	5.03
V XX	23	4	$1s^22s^2(1\mathrm{S}_0)$	[1486]	159.363	1	3	0.169	5.45
V XXI	23	3	$1s^22s(2\mathrm{S}_{1/2})$	1569.6	240.423	2	4	0.0498	5.10
V XXII	23	2	$1s^2(1\mathrm{S}_0)$	6851.77	2.3817	1	3	0.728	4.26
V XXIII	23	1	$1s(2\mathrm{S}_{1/2})$	7246.13	2.280	2	6	0.416	4.00
Cr I	24	24	$..2p^63s^23p^63d^54s(7\mathrm{S}_3)$	6.7666	3579.705	7	9	0.366	8.80
Cr II	24	23	$..2s^22p^63s^23p^63d^5(6\mathrm{S}_{5/2})$	16.4975	2056.254	6	8	0.14	8.14
Cr III	24	22	$..2s^22p^63s^23p^63d^4(5\mathrm{D}_0)$	30.96	1040.050	1	3	0.122	7.78
Cr V	24	20	$..2s^22p^63s^23p^63d^2(3\mathrm{F}_2)$	69.46	437.655	5	5	0.0373	6.89
Cr VI	24	19	$..2s^22p^63s^23p^63d(2\mathrm{D}_{3/2})$	90.636	201.007	4	4	1.5	8.16
Cr VII	24	18	$1s^22s^22p^63s^23p^6(1\mathrm{S}_0)$	160.18	202.828	1	3	3.09	8.48
Cr VIII	24	17	$1s^22s^22p^63s^23p^5(2\mathrm{P}^\circ_{3/2})$	[184.7]	205.01	4	6	1.44	8.15
Cr IX	24	16	$1s^22s^22p^63s^23p^4(3\mathrm{P}_2)$	[209.3]	220.02	5	7	0.67	7.85
Cr X	24	15	$1s^22s^22p^63s^23p^3(4\mathrm{S}^\circ_{3/2})$	[244.4]	226.24	4	6	0.84	7.96
Cr XI	24	14	$1s^22s^22p^63s^23p^2(3\mathrm{P}_0)$	[270.8]	412.629	1	3	0.063	7.09
Cr XII	24	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	[298.0]	244.70	2	4	0.539	7.80
Cr XIII	24	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	[354.8]	328.29	1	3	0.901	8.15
Cr XIV	24	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	384.17	389.81	2	4	0.292	7.74
Cr XV	24	10	$1s^22s^22p^6(1\mathrm{S}_0)$	1010.6	18.497	1	3	2.49	7.34
Cr XVI	24	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	[1097]	106.629	4	2	0.0646	6.52
Cr XVII	24	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[1185]	122.91	5	5	0.074	6.64
Cr XVIII	24	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	[1299]	149.80	4	6	0.059	6.63
Cr XIX	24	6	$1s^22s^22p^2(3\mathrm{P}_0)$	[1396]	148.64	1	3	0.089	6.80
Cr XX	24	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	[1496]	156.00	2	4	0.061	6.66
Cr XXI	24	4	$1s^22s^2(1\mathrm{S}_0)$	[1634]	149.87	1	3	0.164	7.07
Cr XXII	24	3	$1s^22s(2\mathrm{S}_{1/2})$	1721.6	223.015	2	4	0.049	6.72
Cr XXIII	24	2	$1s^2(1\mathrm{S}_0)$	7482.4	2.182	1	3	0.721	5.88
Cr XXIV	24	1	$1s(2\mathrm{S}_{1/2})$	7894.79	2.092	2	6	0.416	5.62

Table 4. Ionization thresholds and strongest lines of atoms and ions

					The strongest resonance line				
Species	Z	N	Configuration	E, eV	λ, Å	g_i	g_k	f_{ik}	P
Mn I	25	25	$..2p^6 3s^2 3p^6 3d^5 4s^2 (6\mathrm{S}_{5/2})$	7.4341	2795.641	6	8	0.565	8.73
Mn II	25	24	$..2p^6 3s^2 3p^6 3d^5 4s (7\mathrm{S}_3)$	15.64011	2576.877	7	9	0.351	8.49
Mn VI	25	20	$..2s^2 2p^6 3s^2 3p^6 3d^2 (3\mathrm{F}_2)$	95.748	310.182	5	5	0.0404	6.63
Mn VII	25	19	$..2s^2 2p^6 3s^2 3p^6 3d (2\mathrm{D}_{3/2})$	119.27	182.499	4	4	1.3	7.91
Mn VIII	25	18	$1s^2 2s^2 2p^6 3s^2 3p^6 (1\mathrm{S}_0)$	194.5	185.46	1	3	2.87	8.26
Mn IX	25	17	$1s^2 2s^2 2p^6 3s^2 3p^5 (2\mathrm{P}^\circ_{3/2})$	[221.8]	188.48	4	6	1.33	7.93
Mn X	25	16	$1s^2 2s^2 2p^6 3s^2 3p^4 (3\mathrm{P}_2)$	[248.3]	202.93	5	5	0.63	7.64
Mn XI	25	15	$1s^2 2s^2 2p^6 3s^2 3p^3 (4\mathrm{S}^\circ_{3/2})$	[286.0]	209.57	4	6	0.76	7.73
Mn XII	25	14	$1s^2 2s^2 2p^6 3s^2 3p^2 (3\mathrm{P}_0)$	[314.4]	386.27	1	3	0.066	6.94
Mn XIII	25	13	$1s^2 2s^2 2p^6 3s^2 3p (2\mathrm{P}^\circ_{1/2})$	[343.6]	226.91	2	4	0.52	7.60
Mn XIV	25	12	$1s^2 2s^2 2p^6 3s^2 (1\mathrm{S}_0)$	403.0	304.85	1	3	0.863	7.95
Mn XV	25	11	$1s^2 2s^2 2p^6 3s (2\mathrm{S}_{1/2})$	435.16	360.97	2	4	0.281	7.54
Mn XVI	25	10	$1s^2 2s^2 2p^6 (1\mathrm{S}_0)$	1133.1	16.617	1	3	2.48	7.15
Mn XVII	25	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[1224]	99.995	4	2	0.0623	6.32
Mn XVIII	25	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[1317]	115.38	5	5	0.071	6.44
Mn XIX	25	7	$1s^2 2s^2 2p^3 (4\mathrm{S}^\circ_{3/2})$	[1437]	141.03	4	6	0.056	6.43
Mn XX	25	6	$1s^2 2s^2 2p^2 (3\mathrm{P}_0)$	[1539]	138.30	1	3	0.091	6.63
Mn XXI	25	5	$1s^2 2s^2 2p (2\mathrm{P}^\circ_{1/2})$	[1644]	145.45	2	4	0.061	6.48
Mn XXII	25	4	$1s^2 2s^2 (1\mathrm{S}_0)$	[1788]	141.09	1	3	0.159	6.88
Mn XXIII	25	3	$1s^2 2s (2\mathrm{S}_{1/2})$	1879.9	206.921	2	4	0.0483	6.53
Mn XXIV	25	2	$1s^2 (1\mathrm{S}_0)$	8141.35	2.006	1	3	0.712	5.68
Mn XXV	25	1	$1s (2\mathrm{S}_{1/2})$	8571.94	1.927	2	6	0.416	5.43
Fe I	26	26	$..2p^6 3s^2 3p^6 3d^6 4s^2 (5\mathrm{D}_4)$	7.870	2484.0205	9	11	0.557	10.65
Fe II	26	25	$..2p^6 3s^2 3p^6 3d^6 4s (6\mathrm{D}_{9/2}$	16.188	2382.765	10	12	0.301	10.37
Fe III	26	24	$..2s^2 2p^6 3s^2 3p^6 3d^6 (5\mathrm{D}_4)$	30.652	859.723	9	11	0.115	9.51
Fe IV	26	23	$..2s^2 2p^6 3s^2 3p^6 3d^5 (6\mathrm{S}_{5/2})$	[54.8]	525.689	6	8	0.183	9.49
Fe V	26	22	$..2s^2 2p^6 3s^2 3p^6 3d^4 (5\mathrm{D}_0)$	[75.0]	386.261	1	3	0.173	9.33
Fe VI	26	21	$..2s^2 2p^6 3s^2 3p^6 3d^3 (4\mathrm{F}_{3/2})$	[99.1]	[174]	4	4	0.454	9.41
Fe VII	26	20	$..2s^2 2p^6 3s^2 3p^6 3d^2 (3\mathrm{F}_2)$	125.0	[152]	5	3	0.744	9.56
Fe VIII	26	19	$..2s^2 2p^6 3s^2 3p^6 3d (2\mathrm{D}_{3/2})$	151.06	167.486	4	4	1.13	9.79
Fe IX	26	18	$1s^2 2s^2 2p^6 3s^2 3p^6 (1\mathrm{S}_0)$	233.6	171.075	1	3	3.05	10.23
Fe X	26	17	$1s^2 2s^2 2p^6 3s^2 3p^5 (2\mathrm{P}^\circ_{3/2})$	262.1	174.534	4	6	1.28	9.86
Fe XI	26	16	$1s^2 2s^2 2p^6 3s^2 3p^4 (3\mathrm{P}_2)$	290.3	180.407	5	7	0.933	9.74
Fe XII	26	15	$1s^2 2s^2 2p^6 3s^2 3p^3 (4\mathrm{S}^\circ_{3/2})$	[330.8]	195.119	4	6	0.758	9.68
Fe XIII	26	14	$1s^2 2s^2 2p^6 3s^2 3p^2 (3\mathrm{P}_0)$	[361.0]	197.434	1	3	0.728	9.67
Fe XIV	26	13	$1s^2 2s^2 2p^6 3s^2 3p (2\mathrm{P}^\circ_{1/2})$	[392.2]	211.328	2	4	0.496	9.53
Fe XV	26	12	$1s^2 2s^2 2p^6 3s^2 (1\mathrm{S}_0)$	457.0	284.147	1	3	0.824	9.88
Fe XVI	26	11	$1s^2 2s^2 2p^6 3s (2\mathrm{S}_{1/2})$	489.27	335.407	2	4	0.265	9.46
Fe XVII	26	10	$1s^2 2s^2 2p^6 (1\mathrm{S}_0)$	[1262]	15.013	1	3	2.96	9.16
Fe XVIII	26	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[1358]	14.202	4	6	0.939	8.64
Fe XIX	26	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[1456]	13.264	5	7	0.574	8.39
Fe XX	26	7	$1s^2 2s^2 2p^3 (4\mathrm{S}^\circ_{3/2})$	[1582]	12.817	4	6	0.944	8.59
Fe XXI	26	6	$1s^2 2s^2 2p^2 (3\mathrm{P}_0)$	[1689]	[12.4]	1	3	0.959	8.58
Fe XXII	26	5	$1s^2 2s^2 2p (2\mathrm{P}^\circ_{1/2})$	[1799]	11.767	2	4	0.680	8.41
Fe XXIII	26	4	$1s^2 2s^2 (1\mathrm{S}_0)$	[1950]	132.85	1	3	0.152	8.82
Fe XXIV	26	3	$1s^2 2s (2\mathrm{S}_{1/2})$	2046	192.017	2	4	0.0482	8.48
Fe XXV	26	2	$1s^2 (1\mathrm{S}_0)$	8828.8	1.8503	1	3	0.798	7.68
Fe XXVI	26	1	$1s (2\mathrm{S}_{1/2})$	9277.65	1.780	2	6	0.416	7.38
Co I	27	27	$..2p^6 3s^2 3p^6 3d^7 4s^2 (4\mathrm{F}_{9/2})$	7.864	2407.983	10	12	0.38	7.87
Co II	27	26	$..2s^2 2p^6 3s^2 3p^6 3d^8 (3\mathrm{F}_4)$	17.083	1466.203	9	11	0.14	7.22
Co III	27	25	$..2s^2 2p^6 3s^2 3p^6 3d^7 (4\mathrm{F}_{9/2})$	33.50	939.061	10	8	0.0897	6.84

Table 4. Ionization thresholds and strongest lines of atoms and ions

					The strongest resonance line				
Species	Z	N	Configuration	E, eV	λ, Å	g_i	g_k	f_{ik}	P
Co VIII	27	20	$..2s^22p^63s^23p^63d^2(3\mathrm{F}_2)$	157.8	162.337	5	5	0.87	7.06
Co IX	27	19	$..2s^22p^63s^23p^63d(2\mathrm{D}_{3/2})$	186.13	154.942	4	4	1.2	7.18
Co X	27	18	$1s^22s^22p^63s^23p^6(1\mathrm{S}_0)$	275.4	158.87	1	3	2.5	7.51
Co XI	27	17	$1s^22s^22p^63s^23p^5(2\mathrm{P}^\circ_{3/2})$	305.3	162.56	4	6	1.15	7.18
Co XII	27	16	$1s^22s^22p^63s^23p^4(3\mathrm{P}_2)$	[336]	175.44	5	5	0.55	6.89
Co XIII	27	15	$1s^22s^22p^63s^23p^3(4\mathrm{S}^\circ_{3/2})$	[379]	182.52	4	6	0.67	7.00
Co XV	27	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	[444]	197.54	2	4	0.45	6.86
Co XVI	27	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	511.96	265.74	1	3	0.796	7.24
Co XVII	27	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	546.59	312.542	2	4	0.261	6.82
Co XVIII	27	10	$1s^22s^22p^6(1\mathrm{S}_0)$	1397.2	13.631	1	3	2.4	6.42
Co XIX	27	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	1504.6	88.339	4	2	0.0586	5.62
Co XX	27	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[1603]	101.88	5	5	0.065	5.73
Co XXI	27	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	[1735]	125.15	4	6	0.0491	5.70
Co XXII	27	6	$1s^22s^22p^2(3\mathrm{P}_0)$	[1846]	119.92	1	3	0.096	5.97
Co XXIII	27	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	[1962]	110.71	2	2	0.079	5.85
Co XXIV	27	4	$1s^22s^2(1\mathrm{S}_0)$	[2119]	125.15	1	3	0.152	6.19
Co XXV	27	3	$1s^22s(2\mathrm{S}_{1/2})$	2219.0	178.199	2	4	0.0474	5.84
Co XXVI	27	2	$1s^2(1\mathrm{S}_0)$	9544.83	1.712	1	3	0.693	4.98
Co XXVII	27	1	$1s(2\mathrm{S}_{1/2})$	10012.07	1.649	2	6	0.416	4.75
Ni I	28	28	$..2p^63s^23p^63d^84s^2(3\mathrm{F}_4)$	7.638	2320.744	9	11	0.685	9.45
Ni II	28	27	$..2s^22p^63s^23p^63d^9(2\mathrm{D}_{5/2})$	18.16898	1317.217	6	8	0.146	8.53
Ni IX	28	20	$..2s^22p^63s^23p^63d^2(3\mathrm{F}_2)$	[193]	151.281	5	5	0.8	8.33
Ni XI	28	18	$1s^22s^22p^63s^23p^6(1\mathrm{S}_0)$	[321.0]	148.402	1	3	2.31	8.79
Ni XII	28	17	$1s^22s^22p^63s^23p^5(2\mathrm{P}^\circ_{3/2})$	[352]	152.153	4	6	1.08	8.47
Ni XIII	28	16	$1s^22s^22p^63s^23p^4(3\mathrm{P}_2)$	[384]	164.146	5	5	0.52	8.18
Ni XIV	28	15	$1s^22s^22p^63s^23p^3(4\mathrm{S}^\circ_{3/2})$	[430]	171.37	4	6	0.62	8.28
Ni XV	28	14	$1s^22s^22p^63s^23p^2(3\mathrm{P}_0)$	[464]	298.150	1	3	0.074	7.59
Ni XVI	28	13	$1s^22s^22p^63s^23p(2\mathrm{P}^\circ_{1/2})$	[499]	239.508	2	2	0.224	7.98
Ni XVII	28	12	$1s^22s^22p^63s^2(1\mathrm{S}_0)$	571.30	249.189	1	3	0.768	8.53
Ni XVIII	28	11	$1s^22s^22p^63s(2\mathrm{S}_{1/2})$	607.06	291.985	2	4	0.253	8.12
Ni XIX	28	10	$1s^22s^22p^6(1\mathrm{S}_0)$	1541	12.430	1	3	2.55	7.75
Ni XX	28	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	[1648]	83.180	4	2	0.0571	6.93
Ni XXI	28	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[1756]	95.85	5	5	0.063	7.03
Ni XXII	28	7	$1s^22s^22p^3(4\mathrm{S}^\circ_{3/2})$	[1894]	117.91	4	6	0.0458	6.98
Ni XXIII	28	6	$1s^22s^22p^2(3\mathrm{P}_0)$	[2011]	111.86	1	3	0.098	7.29
Ni XXIV	28	5	$1s^22s^22p(2\mathrm{P}^\circ_{1/2})$	[2131]	104.64	2	2	0.077	7.16
Ni XXV	28	4	$1s^22s^2(1\mathrm{S}_0)$	[2295]	117.91	1	3	0.149	7.49
Ni XXVI	28	3	$1s^22s(2\mathrm{S}_{1/2})$	2399.2	165.42	2	4	0.0472	7.14
Ni XXVII	28	2	$1s^2(1\mathrm{S}_0)$	10289.5	1.588	1	3	0.683	6.29
Ni XXVIII	28	1	$1s(2\mathrm{S}_{1/2})$	10775.3	1.532	2	6	0.416	6.05
Cu I	29	29	$..2p^63s^23p^63d^{10}4s(2\mathrm{S}_{1/2})$	7.7264	3248.474	2	4	0.431	7.42
Cu II	29	28	$..2s^22p^63s^23p^63d^{10}(1\mathrm{S}_0)$	20.2921	1358.7730	1	3	0.38	6.98
Cu XXI	29	9	$1s^22s^22p^5(2\mathrm{P}^\circ_{3/2})$	[1793]	78.395	4	2	0.0557	4.91
Cu XXII	29	8	$1s^22s^22p^4(3\mathrm{P}_2)$	[1905]	90.264	5	5	0.0603	5.01
Cu XXVI	29	4	$1s^22s^2(1\mathrm{S}_0)$	[2459]	111.2	1	3	0.146	5.48
Cu XXVII	29	3	$1s^22s(2\mathrm{S}_{1/2})$	[2585]	153.6	2	4	0.0472	5.13
Cu XXVIII	29	2	$1s^2(1\mathrm{S}_0)$	11063.1	1.478	1	3	0.673	4.27
Cu XXIX	29	1	$1s(2\mathrm{S}_{1/2})$	11567.5	1.427	2	6	0.416	4.04

Table 4. Ionization thresholds and strongest lines of atoms and ions

Species	Z	N	Configuration	E, eV	The strongest resonance line				
					λ, Å	g_i	g_k	f_{ik}	P
ZnI	30	30	$..2p^6 3s^2 3p^6 3d^{10} 4s^2 (1\mathrm{S}_0)$	9.3943	2139.2473	1	3	1.46	8.14
ZnII	30	29	$..2p^6 3s^2 3p^6 3d^{10} 4s (2\mathrm{S}_{1/2})$	17.9645	2026.136	2	4	0.515	7.67
ZnXXII	30	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[1953]	73.943	4	2	0.0546	5.26
ZnXXIII	30	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[2070]	85.034	5	5	0.0583	5.35
ZnXXVII	30	4	$1s^2 2s^2 (1\mathrm{S}_0)$	[2647]	217.	1	3	0.00285	4.44
ZnXXVIII	30	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[2780]	142.4	2	4	0.0473	5.48
ZnXXIX	30	2	$1s^2 (1\mathrm{S}_0)$	11865.6	1.378	1	3	0.663	4.61
ZnXXX	30	1	$1s (2\mathrm{S}_{1/2})$	12388.8	1.333	2	6	0.416	4.39
GaI	31	31	$..3s^2 3p^6 3d^{10} 4s^2 4p (2\mathrm{P}^\circ_{1/2})$	5.999	2875.078	2	4	0.303	6.07
GaII	31	30	$..2p^6 3s^2 3p^6 3d^{10} 4s^2 (1\mathrm{S}_0)$	20.51	1414.402	1	3	1.8	6.54
GaIII	31	29	$..2p^6 3s^2 3p^6 3d^{10} 4s (2\mathrm{S}_{1/2})$	30.71	1495.045	2	4	0.543	6.04
GaXIII	31	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[2120]	69.787	4	2	0.054	3.71
GaXXIV	31	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[2242]	80.139	5	5	0.057	3.79
GaXXIX	31	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[2982]	132.2	2	4	0.0477	3.93
GaXXX	31	2	$1s^2 (1\mathrm{S}_0)$	12697	1.288	1	3	0.653	3.05
GaXXXI	31	1	$1s (2\mathrm{S}_{1/2})$	13239	1.247	2	6	0.416	2.84
GeI	32	32	$..3s^2 3p^6 3d^{10} 4s^2 4p^2 (3\mathrm{P}_0)$	7.899	2652.3577	1	3	0.269	6.48
GeII	32	31	$..3s^2 3p^6 3d^{10} 4s^2 4p (2\mathrm{P}^\circ_{1/2})$	15.934	1602.4863	2	2	0.135	5.97
GeIII	32	30	$..2p^6 3s^2 3p^6 3d^{10} 4s^2 (1\mathrm{S}_0)$	34.22	1088.5	1	3	1.79	6.92
GeIV	32	29	$..2p^6 3s^2 3p^6 3d^{10} 4s (2\mathrm{S}_{1/2})$	45.71	1189.0280	2	4	0.53	6.43
GeXXIV	32	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[2294]	65.898	4	2	0.053	4.17
GeXXV	32	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[2421]	75.548	5	5	0.056	4.26
GeXXX	32	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[3192]	122.6	2	4	0.0481	4.40
GeXXXI	32	2	$1s^2 (1\mathrm{S}_0)$	13558	1.206	1	3	0.643	3.52
GeXXXII	32	1	$1s (2\mathrm{S}_{1/2})$	14119	1.169	2	6	0.416	3.32
AsI	33	33	$..3s^2 3p^6 3d^{10} 4s^2 4p^3 (4\mathrm{S}^\circ_{3/2})$	9.81	1890.42	4	6	0.161	4.85
AsXXV	33	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[2474]	62.253	4	2	0.052	2.88
AsXXVI	33	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[2606]	71.238	5	5	0.055	2.96
AsXXXI	33	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[3406]	113.8	2	4	0.0485	3.11
AsXXXII	33	2	$1s^2 (1\mathrm{S}_0)$	14448	1.132	1	3	0.633	2.23
AsXXXIII	33	1	$1s (2\mathrm{S}_{1/2})$	15029	1.098	2	6	0.416	2.03
SeXXVI	34	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[2661]	58.8	4	2	0.051	3.83
SeXXVII	34	8	$1s^2 2s^2 2p^4 (3\mathrm{P}_2)$	[2798]	67.185	5	5	0.053	3.90
SeXXXII	34	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[3633]	105.6	2	4	0.0489	4.06
SeXXXIII	34	2	$1s^2 (1\mathrm{S}_0)$	15367	1.064	1	3	0.623	3.17
SeXXXIV	34	1	$1s (2\mathrm{S}_{1/2})$	15968	1.033	2	6	0.416	2.98
BrI	35	35	$..3s^2 3p^6 3d^{10} 4s^2 4p^5 (2\mathrm{P}^\circ_{3/2})$	11.814	1540.654	4	4	0.0498	4.51
BrXXVII	35	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[2855]	55.6	4	2	0.0506	3.08
BrXXXII	35	4	$1s^2 2s^2 (1\mathrm{S}_0)$	[3684]	174.	1	3	0.00485	2.56
BrXXXIII	35	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[3865]	98.0	2	4	0.0493	3.31
BrXXXIV	35	2	$1s^2 (1\mathrm{S}_0)$	16317	1.002	1	3	0.614	2.42
BrXXXV	35	1	$1s (2\mathrm{S}_{1/2})$	16937	0.974	2	6	0.416	2.24
KrXXVIII	36	9	$1s^2 2s^2 2p^5 (2\mathrm{P}^\circ_{3/2})$	[3056]	52.6	4	2	0.0501	3.65
KrXXXIII	36	4	$1s^2 2s^2 (1\mathrm{S}_0)$	[3912]	167.	1	3	0.00524	3.17
KrXXXIV	36	3	$1s^2 2s (2\mathrm{S}_{1/2})$	[4105]	91.0	2	4	0.0499	3.89
KrXXXV	36	2	$1s^2 (1\mathrm{S}_0)$	17296	0.946	1	3	0.606	2.99
KrXXXVI	36	1	$1s (2\mathrm{S}_{1/2})$	17936	0.920	2	6	0.416	2.81

Table 4. Ionization thresholds and strongest lines of atoms and ions

Species	Z	N	Configuration	E, eV	The strongest resonance line λ, Å	g_i	g_k	f_{ik}	P
RbI	37	37	$..3p^6 3d^{10} 4s^2 4p^6 5s(2\mathrm{S}_{1/2})$	4.177	7802.374	2	4	0.675	6.12
SrI	38	38	$..3p^6 3d^{10} 4s^2 4p^6 5s^2(1\mathrm{S}_0)$	5.695	4608.622	1	3	1.92	6.88
SrII	38	37	$..3p^6 3d^{10} 4s^2 4p^6 5s(2\mathrm{S}_{1/2})$	11.030	4078.865	2	4	0.708	6.39
YI	39	39	$..3d^{10} 4s^2 4p^6 4d 5s^2(2\mathrm{D}_{3/2})$	6.38	4144.03	4	4	0.412	5.45
YII	39	38	$..3p^6 3d^{10} 4s^2 4p^6 5s^2(1\mathrm{S}_0)$	12.24	3497.08	1	3	0.192	5.05
MoI	42	42	$..3d^{10} 4s^2 4p^6 4d^5 5s(7\mathrm{S}_3)$	7.099	3133.499	7	9	0.339	4.99
RhI	45	45	$..3d^{10} 4s^2 4p^6 4d^8 5s(4\mathrm{F}_{9/2})$	7.46	3693.408	10	8	0.149	3.83
AgI	47	47	$..3d^{10} 4s^2 4p^6 4d^9 5s^2(2\mathrm{S}_{1/2})$	7.576	3281.627	2	4	0.452	4.41
CdI	48	48	$..3d^{10} 4s^2 4p^6 4d^{10} 5s^2(1\mathrm{S}_0)$	8.993	2288.724	1	3	1.25	5.22
CdII	48	47	$..3d^{10} 4s^2 4p^6 4d^9 5s^2(2\mathrm{S}_{1/2})$	16.908	2145.083	2	4	0.386	4.68
InI	49	49	$..4s^2 4p^6 4d^{10} 5s^2 5p(2\mathrm{P}^\circ_{1/2})$	5.786	3040.24	2	4	0.36	3.86
SnI	50	50	$..4s^2 4p^6 4d^{10} 5s^2 5p^2(3\mathrm{P}_0)$	7.344	2246.745	1	3	0.363	5.05
II	53	53	$..4s^2 4p^6 4d^{10} 5s^2 5p^5(2\mathrm{P}^\circ_{3/2})$	10.457	1782.758	4	4	0.129	3.87
XeI	54	54	$..4s^2 4p^6 4d^{10} 5s^2 5p^6(1\mathrm{S}_0)$	12.130	1192.04	1	3	0.396	4.90
CsI	55	55	$..4p^6 4d^{10} 5s^2 5p^6 6s(2\mathrm{S}_{1/2})$	3.894	4556.698	2	4	0.0117	2.85
BaI	56	56	$..4p^6 4d^{10} 5s^2 5p^6 6s^2(1\mathrm{S}_0)$	5.212	5537.021	1	3	1.64	6.17
BaII	56	55	$..4p^6 4d^{10} 5s^2 5p^6 6s(2\mathrm{S}_{1/2})$	10.004	4555.310	2	4	0.728	5.73
NdII	60	59	$..4d^{10} 4f^4 5s^2 5p^6 6s(6\mathrm{I}_{7/2})$	10.72	4304.784	8	10	0.163	4.32
EuI	63	63	$..4d^{10} 4f^7 5s^2 5p^6 6s^2(8\mathrm{S}^\circ_{7/2})$	5.67	4595.32	8	10	0.554	3.95
TmI	69	69	$..4d^{10} 4f^{13} 5s^2 5p^6 6s^2(2\mathrm{F}^\circ_{7/2})$	6.18	3888.448	8	8	0.0861	2.65
YbI	70	70	$..4d^{10} 4f^{14} 5s^2 5p^6 6s^2(1\mathrm{S}_0)$	6.254	3989.11	1	3	1.26	4.65
YbII	70	69	$..4d^{10} 4f^{14} 5s^2 5p^6 6s(2\mathrm{S}_{1/2})$	12.17	3290.31	2	4	0.584	4.23
IrI	77	77	$..4f^{14} 5s^2 5p^6 5d^7 6s^2(4\mathrm{F}_{9/2})$	9.1	2640.499	10	10	0.0491	3.48
AuI	79	79	$..4f^{14} 5s^2 5p^6 5d^{10} 6s(2\mathrm{S}_{1/2})$	9.225	2428.69	2	4	0.352	3.76
HgI	80	80	$..4f^{14} 5s^2 5p^6 5d^{10} 6s^2(1\mathrm{S}_0)$	10.437	2537.279	1	3	0.0232	2.86
TlI	81	81	$..5s^2 5p^6 5d^{10} 6s^2 6p(2\mathrm{P}^\circ_{1/2})$	6.108	2768.74	2	4	0.29	3.72
PbI	82	82	$..5s^2 5p^6 5d^{10} 6s^2 6p^2(3\mathrm{P}_0)$	7.416	2170.675	1	3	0.318	4.89
BiI	83	83	$..5s^2 5p^6 5d^{10} 6s^2 6p^3(4\mathrm{S}^\circ_{3/2})$	7.289	2231.319	4	6	0.291	3.52