Wavelengths, Transition Probabilities, and Energy Levels for the Spectrum of Neutral Strontium (Sr I)

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Following a critical review of spectroscopic data for neutral strontium (Z=38), the energy levels, with designations and uncertainties, have been tabulated. Wavelengths with classifications, intensities, and transition probabilities have also been reviewed. In addition, the $5s\ ^2S_{1/2}$, $4d\ ^2D_{3/2}$, and $4d\ ^2D_{5/2}$ ionization energies have been listed. A summary of the current state of measurements of the Sr I $5s^2\ ^1S_0$-$5s5p\ ^3P_0^\circ$, $F=9/2$ atomic clock transition, and other isotopic observations has also been included. *© 2010 by the U.S. Secretary of Commerce on behalf of the United States. All rights reserved.* [doi:10.1063/1.3449176]

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1. Introduction

Strontianite was distinguished from barium minerals by Adair Crawford in 1774, but elemental strontium was not isolated until 1808 by Sir Humphrey Davy, who used electrolysis to do so. Its name comes from the Scottish town Strontian. As a member of the alkaline earth group of elements, it has chemical properties similar to calcium and is a soft, silvery metal at room temperature. It oxidizes rapidly when exposed to air. It has a melting point of 777 °C and a boiling point of 1382 °C. Its atomic number is 38, the atomic mass is 87.62, and its specific gravity at 20 °C is 2.64 [08CRC]. The ground state of neutral strontium is $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 5s^2\ ^1S_0$.

There are four stable isotopes of strontium plus one (^{90}Sr) with a half life of 29.1 year The latter is present in the fallout from nuclear explosions and is of particular concern because it causes health problems. Data for these five most common isotopes are summarized in Table 1. There are 32 other known radioactive isotopes and isomers of strontium.

The ionization energies and all energy levels and level uncertainties in this paper are given in cm^{-1}. As reported in [05MOH/TAY] the unit cm^{-1} is related to the SI unit for energy, the joule, by 1 cm^{-1}=1.986 445 61(34)$\times 10^{-23}$ J.

The emission spectrum of neutral strontium has been studied in great detail, starting in the early 1900s [10SAU, 18MEG, 22SAU, 25RUS/SAU, 31WHI, 33MEG]. A significant improvement in wavelength measurements was published by Sullivan [38SUL] who measured transitions from 2300 to 10 036 Å using a Fabry–Pérot interferometer. This information, along with unpublished material by Humphreys and Russell, was used by Moore [52MOO] to produce a comprehensive table of energy levels.

Following this, research interest turned to the absorption spectrum, with Garton and Codling [68GAR/COD] measuring principal series lines between 1651 and 2429 Å to obtain $5snp$, $4dnp$, and $4dnf$ energy levels up to n=33. In a companion paper Garton *et al.* [68GAR/GRA] reported the first photometric observation of the strontium spectrum, which allowed them to calculate absorption cross sections. A similar set of measurements enabled Hudson *et al.* [69HUD/CAR] to locate $4dnf$ levels up to n=43 and also to determine oscillator strengths for the transitions. Newsom *et al.* [73NEW/OCO] combined absorption measurements in the 2100–7600 Å region with emission data extending to 26 000 Å to determine several new energy levels just above the first ionization limit. The absorption spectrum was extended further into the ultraviolet by Brown *et al.* [83BRO/LON], who observed features down to 1400 Å. By using photoabsorption, the accuracy of $5snp\ ^1P_1$ levels was further improved by Baig and Connerade [84BAI/CON], who also extended the range to n=84.

The introduction of lasers to pump neutral atoms into low-lying excited states from which absorption spectra could be obtained, made several additional Rydberg series accessible for study. Ewart and Purdie [76EWA/PUR] extended the $5sns\ ^1S_0$ and $5snd\ ^1D_2$ series to n=40 and Esherick [77ESH]

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Table 1. Principal Isotopes of Strontium

Isotope	Atomic Mass[a]	Natural Abundance[a] (Atom %)	Spin[a]	Nuclear Magnetic Moment[b] (μ/μ_N)	Ionization Energy[c] (cm^{-1})
^{84}Sr	83.913 425	0.56(1)	0		45 932.1833(10)
^{86}Sr	85.909 260	9.86(1)	0		45 932.1912(10)
^{87}Sr	86.908 877	7.00(1)	9/2	−1.093 603 0(13)	45 932.2861(10)
^{88}Sr	87.905 612	82.58(1)	0		45 932.1982(10)
^{90}Sr	89.907 738		0		

[a]From [08CRC].
[b]From [89RAG].
[c]From [82BEI/LUC].

extended them to n=70 and added 5snd ^{3}D$_2$ levels up to n=37. In 1978 Rubbmark and Borgström [78RUB/BOR] combined new absorption spectra with the previous observations to improve the accuracy of many energy levels and add the 5snf ^{1}F$_3$ series to n=29. Armstrong *et al.* [79ARM/WYN] extended the technique to include two-step laser pumping into the 5s6s ^{3}S$_1$ level, from which a tunable laser stimulated transitions to 5snp ^{3}P$_{0,1,2}$ levels up to n=60.

By using a single laser to produce two-photon absorption in strontium, Beigang *et al.* [82BEI/LUC] were able to measure the energies of 5sns ^{1}S$_0$ and 5snd ^{1}D$_2$ levels with an absolute accuracy of 0.0010 cm^{-1} for n up to 84. In a separate experiment Beigang *et al.* [82BEI/LUC2] populated the 5s5p ^{3}P$_{1,2,3}$ levels in a dc discharge and used a laser to excite levels of 5sns ^{3}S$_1$ and 5snd ^{3}D$_{1,2,3}$. Laser excitation also allowed Kompsitas *et al.* [90KOM/COH, 91KOM/GOU] to observe J=3 odd-parity levels and even-parity 4dnd, J=0,1 levels above the first ionization energy. A three-laser technique was used by Dai and Zhao [95DAI, 95DAI/ZHA] to measure energies and lifetimes of 5sns ^{1}S$_0$ and 5snd ^{1,3}D$_2$ levels. Lifetimes of highly excited 5sns ^{3}S$_1$ and 5snd ^{3}D$_3$ levels have also been reported by Kunze *et al.* [93KUN/HOH], along with improvements in some of the level values. The first observations of 4dng levels have been reported by Jimoyannis *et al.* [92JIM/BOL, 93JIM/BOL]. Yaseen *et al.* [02YAS/ALI] used two-color, three-photon resonant excitation to observe highly excited 4dnp and 4dnf levels up to n=43. Recently, improvements in measurements of highly excited 5sns ^{1}S$_0$, 5snp ^{1}P$_1$, 5snd ^{1,3}D$_2$, and 5snf ^{1}F$_3$ levels were reported by Philip *et al.* [01MAK/PHI, 06PHI/MAK, 07PHI/CON].

2. Strontium Clock Transitions

In recent years there has been a flurry of spectroscopic research on the frequency of the 5s^2 ^{1}S$_0$-5s5p ^{3}P$^\circ_0$ transition in the isotopes ^{87}Sr and ^{88}Sr because they are candidates to be used to create an optical clock. Because the ^{88}Sr isotope is bosonic while ^{87}Sr is fermionic and has a nonzero nuclear spin, each presents a different set of challenges in measuring and evaluating the frequency of the clock transition. At first, probes of optically trapped atoms were done [03COU/QUE, 03FER/CAN, 05IDO/LOF], but more lately atoms confined in optical lattices have been utilized [05TAK/HON, 05SAN/ARI, 07FOU/TAR, 07BAI/FOU, 07ZEL/BOY, 08CAM/LUD] because of their enhanced stability. In addition to the clock frequency, Courtillot *et al.* [05COU/QUE] have reported measurements of the 5s^2 ^{1}S$_0$-5s5p ^{3}P$^\circ_1$ and 5s5p ^{3}P$^\circ_{0,1}$-5s6s ^{3}S$_1$ transitions. Ido *et al.* [05IDO/LOF] determined a value for 5s^2 ^{1}S$_0$-5s5p ^{3}P$^\circ_1$ in ^{88}Sr, while Ferrari *et al.* [03FER/CAN] measured it in ^{86}Sr. The ^{87}Sr 5s^2 ^{1}S$_0$-5s5p ^{3}P$^\circ_0$ transition probability is obtained from the lifetime measurement of Zelevinsky *et al.* [07ZEL/BOY]. That of the 5s^2 ^{1}S$_0$-5s5p ^{3}P$^\circ_0$ of ^{88}Sr was calculated by Liu *et al.* [07LIU/AND], whose result is within 10% of Santra *et al.* [04SAN/CHR]. The observed frequencies for these single-isotope transitions with smallest reported uncertainties are summarized in Table 2.

3. Ionization Energies

Several groups have investigated the ionization energy of neutral strontium with increasingly precise results over the years. Based on all the data available in 1952, Moore [52MOO] obtained a value of 45 925.6 cm^{-1} for the lowest ionization energy—the 5s ^{2}S$_{1/2}$ limit. By extending the observed 5snp ^{1,3}P$_1$ series Garton and Codling [68GAR/COD] determined the 5s ^{2}S$_{1/2}$ limit to be 45 932.0(2) cm^{-1} and, from series of 4d(^{2}D$_{3/2}$)np and nf levels, a value of 60 487.9 cm^{-1} for the 4d(^{2}D$_{3/2}$) limit. Similar examination of the 4d(^{2}D$_{5/2}$)np and nf levels yielded 60 768.2 cm^{-1} for the 4d(^{2}D$_{5/2}$) ionization energy. Esherick [77ESH] reported values of 45 932.19(20), 60 488.09(20), and 60 768.43 cm^{-1}, respectively, for those three limits and also 70 048.00 cm^{-1} for the average of the 5p ^{2}P$_{1/2,3/2}$ limits. Rubbmark and Borgström [78RUB/BOR] combined 5snd series limits with the other 5snl series to obtain 45 932.09(15) cm^{-1} for the 5s ^{1}S$_0$ limit. A value of 45 932.10(03) cm^{-1} was published by Baig and Connerade [84BAI/CON]. Beigang *et al.* [82BEI/LUC] determined 5s ^{2}S$_{1/2}$ limits for each of the stable isotopes, which are summarized in Table 1. The 5s ^{2}S$_{1/2}$ ionization energy [45 932.2036(10) cm^{-1}] retained in Table 3 has been obtained by weighting the average of the isotopic values by the percent composition in natural strontium.

4. Energy Levels

As indicated in the historical discussion above, Rydberg energy levels for neutral strontium have been studied extensively, with observed principal quantum numbers ranging up

TABLE 2. Isotopic Transition Frequencies

Isotope	Lower Level	Upper Level	Frequency (kHz)	Systematic Unc. (kHz)	Statistical Unc. (kHz)	Frequency Reference	A_{ki} (s^{-1})	A_{ki} Reference
^{86}Sr	$5s^2\ ^1S_0$	$5s5p\ ^3P^\circ_1$	434 828 957 494	5.	5.	03FER/CAN		
^{87}Sr	$5s^2\ ^1S_0$	$5s5p\ ^3P^\circ_0$, $F=9/2$	429 228 004 229.873 65	0.000 058	0.000 37	08CAM/LUD	7.1(20)E-3	07ZEL/BOY
	$5s^2\ ^1S_0$	$5s5p\ ^3P^\circ_1$, $F=7/2$	434 830 473 270	55		05COU/QUE		
	$5s^2\ ^1S_0$	$5s5p\ ^3P^\circ_1$, $F=9/2$	434 829 343 010	50		05COU/QUE		
	$5s^2\ ^1S_0$	$5s5p\ ^3P^\circ_1$, $F=11/2$	434 827 879 860	55		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=7/2$	$5s6s\ ^3S_1$, $F=7/2$	435 733 271 100	600		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=7/2$	$5s6s\ ^3S_1$, $F=9/2$	435 730 832 300	300		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=9/2$	$5s6s\ ^3S_1$, $F=7/2$	435 734 401 750	300		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=9/2$	$5s6s\ ^3S_1$, $F=9/2$	435 731 962 700	300		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=9/2$	$5s6s\ ^3S_1$, $F=11/2$	435 728 981 600	300		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=11/2$	$5s6s\ ^3S_1$, $F=9/2$	435 733 425 800	300		05COU/QUE		
	$5s5p\ ^3P^\circ_1$ $F=11/2$	$5s6s\ ^3S_1$, $F=11/2$	435 730 444 900	300		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=9/2$	$5s6s\ ^3S_1$, $F=7/2$	441 335 740 420	350		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=9/2$	$5s6s\ ^3S_1$, $F=9/2$	441 333 301 370	350		05COU/QUE		
	$5s5p\ ^3P^\circ_1$, $F=9/2$	$5s6s\ ^3S_1$, $F=11/2$	441 330 320 270	350		05COU/QUE		
^{88}Sr	$5s^2\ ^1S_0$	$5s5p\ ^3P^\circ_1$	429 228 066 418.009	0.032	0.0026	07BAI/FOU		
	$5s^2\ ^1S_0$	$5s5p\ ^3P^\circ_1$	434 829 121 311	5.	5.	03FER/CAN	4.53E+4	07LIU/AND
	$5s5p\ ^3P^\circ_1$	$5s6s\ ^3S_1$	435 731 697 200	500		05COU/QUE		
	$5s5p\ ^3P^\circ_0$	$5s6s\ ^3S_1$	441 332 751 300	700		05COU/QUE		

to $n=84$. In order to present the most valuable information in fairly concise tables, we have restricted the data retained in Table 3 to $n \leqslant 20$. In addition, many of the research groups using laser excitation of intermediate states observed doubly excited levels with energies considerably above the first ionization limit. Although it is a somewhat arbitrary cutoff, we restrict the $4dnl$ levels listed to those with $n \leqslant 10$. The $5pnp$, $J=0,1,2$ levels reported by Cohen *et al.* [01COH/AYM], which lie above the $4d\ ^2D_{5/2}$ limit are also not included in this compilation.

For this compilation a classified line list was assembled, then a least squares optimization of the energy levels was made using the level optimization program ELCALC [69RAD]. In addition to the line list, input to ELCALC includes a list of initial level values. The program then iteratively improves the level values to minimize the differences between the observed wave numbers and those predicted from the levels. In the optimization process, each transition is weighted based on a combination of the uncertainty of the experimental wave number and the uncertainty determined for the combining level of opposite parity. In Table 3 the optimized levels are denoted by having [10SAN/NAV] in the reference column.

There are several papers [79ARM/WYN, 95DAI, 82BEI/LUC, 82BEI/LUC2] reporting multiphoton transitions from the ground state which directly obtain values for energy levels. These values are given in the energy level table with the references listed, even though there are no corresponding transitions to enter in the wavelength table. In addition, Kunze *et al.* [93KUN/HOH] used laser excitation from $5s5p$ levels to obtain the values listed for the $5s19s$ and $5s20s\ ^3S_1$, as well as the $5s19d$ and $5s20d\ ^3D_3$ levels. Since the individual transitions were not given in [93KUN/HOH], we were not able to include these levels in the optimization process.

For each energy level in Table 3 we first list the designation, as given by the original author, except where later research has indicated a revision should be made. To ensure that the coupling scheme is consistent within each configuration, *ab initio* calculations were made using the Cowan code [81COW] and a few designations were revised to conform to the predominant coupling scheme. For visual clarity only the first member of each term has the configuration written out. All members of the same term are grouped together and set off from other terms by a blank line. The term is listed for each level. There are three kinds of coupling indicated for the energy levels. Most configurations are described in *LS* coupling. Some levels above the first ionization limit are given in *jK* coupling (also known as J_1l or pair coupling). For these the *J*-value of the core state is included in the designation; the multiplicity as a superscript before the square brackets; and the value of $K=J_1+l$ in square brackets, where l is the orbital angular momentum of the final electron. Kompsitas *et al.* [90KOM/COH, 91KOM/GOU, 92GOU/AYM] used J_1J_2 coupling, with the angular momentum of the core and of the final electron in parentheses. The *J* value of each level is listed in a separate column.

TABLE 3. Energy levels of Sr I

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
$5s^2$	^1S	0	0.000		
$5s5p$	^3P	0	14 317.507	0.001	10SAN/NAV
	^3P	1	14 504.334	0.003	10SAN/NAV
	^3P	2	14 898.545	0.004	10SAN/NAV
	^1P	1	21 698.452	0.004	10SAN/NAV
$5s4d$	^3D	1	18 159.040	0.003	10SAN/NAV
	^3D	2	18 218.784	0.003	10SAN/NAV
	^3D	3	18 319.261	0.004	10SAN/NAV
	^1D	2	20 149.685	0.003	10SAN/NAV
$5s6s$	^3S	1	29 038.773	0.004	10SAN/NAV
	^1S	0	30 591.825	0.016	10SAN/NAV
$4d5p$	^3F	2	33 266.851	0.003	10SAN/NAV
	^3F	3	33 589.709	0.007	10SAN/NAV
	^3F	4	33 919.315	0.006	10SAN/NAV
	^1D	2	33 826.899	0.003	10SAN/NAV
	^3D	1	36 264.151	0.008	10SAN/NAV
	^3D	2	36 381.746	0.008	10SAN/NAV
	^3D	3	36 559.492	0.006	10SAN/NAV
	^3P	0	37 292.074	0.007	10SAN/NAV
	^3P	1	37 302.731	0.006	10SAN/NAV
	^3P	2	37 336.591	0.004	10SAN/NAV
	^1F	3	38 007.742	0.016	10SAN/NAV
	^1P	1	41 172.054	0.014	10SAN/NAV
$5s6p$	^3P	0	33 853.490	0.006	10SAN/NAV
	^3P	1	33 868.317	0.006	10SAN/NAV
	^3P	2	33 973.065	0.004	10SAN/NAV
	^1P	1	34 098.404	0.006	10SAN/NAV
$5s5d$	^1D	2	34 727.447	0.005	10SAN/NAV
	^3D	1	35 006.908	0.007	10SAN/NAV
	^3D	2	35 021.989	0.012	10SAN/NAV
	^3D	3	35 045.019	0.008	10SAN/NAV
$5p^2$	^3P	0	35 193.442	0.019	10SAN/NAV
	^3P	1	35 400.105	0.005	10SAN/NAV
	^3P	2	35 674.637	0.008	10SAN/NAV
	^1D	2	36 960.842	0.005	10SAN/NAV
	^1S	0	37 160.234	0.005	10SAN/NAV
$5s7s$	^3S	1	37 424.675	0.005	10SAN/NAV
	^1S	0	38 444.013	0.007	10SAN/NAV
$5s4f$	^3F	2	38 750.420	0.007	10SAN/NAV
	^3F	3	38 752.410	0.007	10SAN/NAV
	^3F	4	38 755.175	0.008	10SAN/NAV
	^1F	3	39 539.013	0.007	10SAN/NAV
$5s7p$	^1P	1	38 906.858	0.010	10SAN/NAV
	^3P	0	39 411.669	0.008	10SAN/NAV
	^3P	1	39 426.442	0.008	10SAN/NAV
	^3P	2	39 457.383	0.008	10SAN/NAV
$5s6d$	^3D	1	39 685.830	0.017	10SAN/NAV
	^3D	2	39 690.802	0.009	10SAN/NAV
	^3D	3	39 703.109	0.009	10SAN/NAV
	^1D	2	39 733.067	0.009	10SAN/NAV

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
5*s*8*s*	^{3}S	1	40 761.372	0.020	10SAN/NAV
	^{1}S	0	41 052.324	0.019	10SAN/NAV
5*s*5*f*	^{3}F	2	41 364.602	0.018	10SAN/NAV
	^{3}F	3	41 365.482	0.023	10SAN/NAV
	^{3}F	4	41 365.84	0.23	10SAN/NAV
	^{1}F	3	41 519.04	0.19	10SAN/NAV
5*s*8*p*	^{3}P	0	41 712.05	0.05	79ARM/WYN
	^{3}P	1	41 719.71	0.05	79ARM/WYN
	^{3}P	2	41 735.98	0.05	79ARM/WYN
	^{1}P	1	42 462.136	0.014	10SAN/NAV
5*s*7*d*	^{1}D	2	41 831.448	0.021	10SAN/NAV
	^{3}D	1	41 864.354	0.008	10SAN/NAV
	^{3}D	2	41 869.270	0.010	10SAN/NAV
	^{3}D	3	41 874.859	0.010	10SAN/NAV
5*s*9*s*	^{3}S	1	42 451.16	0.35	10SAN/NAV
	^{1}S	0	42 596.572	0.022	10SAN/NAV
5*s*6*f*	^{3}F	2	42 777.023	0.022	10SAN/NAV
	^{3}F	3	42 777.547	0.018	10SAN/NAV
	^{3}F	4	42 778.121	0.009	10SAN/NAV
	^{1}F	3	42 839.589	0.026	10SAN/NAV
5*s*9*p*	^{3}P	0	42 985.86	0.07	79ARM/WYN
	^{3}P	1	42 990.26	0.07	79ARM/WYN
	^{3}P	2	42 999.79	0.07	79ARM/WYN
	^{1}P	1	43 328.04	0.07	10SAN/NAV
5*s*8*d*	^{1}D	2	43 021.058	0.023	10SAN/NAV
	^{3}D	2	43 070.268	0.009	10SAN/NAV
	^{3}D	3	43 074.728	0.010	10SAN/NAV
5*s*10*s*	^{1}S	0	43 512.1658	0.0010	82BEI/LUC
	^{3}S	1	43 427.44	0.19	10SAN/NAV
5*s*7*f*	^{3}F	2	43 623.896	0.026	10SAN/NAV
	^{3}F	3	43 624.205	0.028	10SAN/NAV
	^{3}F	4	43 624.479	0.009	10SAN/NAV
	^{1}F	3	43 656.219	0.028	10SAN/NAV
5*s*9*d*	^{1}D	2	43 755.755	0.025	10SAN/NAV
	^{3}D	2	43 804.890	0.025	10SAN/NAV
5*s*10*p*	^{3}P	0	43 758.65	0.07	79ARM/WYN
	^{3}P	1	43 761.47	0.07	79ARM/WYN
	^{3}P	2	43 767.58	0.07	79ARM/WYN
	^{1}P	1	43 938.201	0.025	10SAN/NAV
5*s*11*s*	^{3}S	1	44 043.35	0.20	10SAN/NAV
	^{1}S	0	44 097.1224	0.0010	82BEI/LUC
5*s*8*f*	^{3}F	2	44 170.80	0.03	10SAN/NAV
	^{3}F	3	44 170.99	0.03	10SAN/NAV
	^{3}F	4	44 171.32	0.03	10SAN/NAV
	^{1}F	3	44 189.889	0.029	10SAN/NAV
5*s*10*d*	^{1}D	2	44 239.4549	0.0010	82BEI/LUC
	^{3}D	2	44 286.91	0.20	95DAI

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
5*s*11*p*	^3P	0	44 262.70	0.07	79ARM/WYN
	^3P	1	44 264.52	0.07	79ARM/WYN
	^3P	2	44 268.72	0.07	79ARM/WYN
	^1P	1	44 366.42	0.03	10SAN/NAV
5*s*12*s*	^3S	1	44 456.25	0.21	10SAN/NAV
	^1S	0	44 492.8348	0.0010	82BEI/LUC
4d^2	^3P	0	44 525.838	0.010	10SAN/NAV
	^3P	1	44 595.920	0.009	10SAN/NAV
	^3P	2	44 729.627	0.010	10SAN/NAV
5*s*9*f*	^3F	2	44 544.27	0.03	10SAN/NAV
	^3F	3	44 544.44	0.03	10SAN/NAV
	^3F	4	44 544.63	0.03	10SAN/NAV
	^1F	3	44 556.48	0.03	10SAN/NAV
5*s*11*d*	^1D	2	44 578.6890	0.0010	82BEI/LUC
	^3D	2	44 619.84	0.20	95DAI
5*s*12*p*	^3P	0	44 609.51	0.04	79ARM/WYN
	^3P	1	44 610.85	0.04	79ARM/WYN
	^3P	2	44 613.78	0.04	79ARM/WYN
	^1P	1	44 675.737	0.029	10SAN/NAV
5*s*13*s*	^3S	1	44 747.65	0.15	82BEI/LUC2
	^1S	0	44 773.6707	0.0010	82BEI/LUC
5*s*10*f*	^3F	2	44 810.53	0.04	10SAN/NAV
	^3F	3	44 810.56	0.04	10SAN/NAV
	^3F	4	44 810.72	0.04	10SAN/NAV
	^1F	3	44 818.77	0.03	10SAN/NAV
5*s*12*d*	^1D	2	44 829.6648	0.0010	82BEI/LUC
	^3D	1	44 854.02	0.15	82BEI/LUC2
	^3D	2	44 860.06	0.15	82BEI/LUC2
	^3D	3	44 865.22	0.15	82BEI/LUC2
5*s*13*p*	^3P	0	44 858.33	0.03	79ARM/WYN
	^3P	1	44 859.32	0.03	79ARM/WYN
	^3P	2	44 861.46	0.03	79ARM/WYN
	^1P	1	44 903.50	0.03	10SAN/NAV
5*s*14*s*	^3S	1	44 960.22	0.15	82BEI/LUC2
	^1S	0	44 979.4540	0.0010	82BEI/LUC
5*s*11*f*	^3F	2	45 006.93	0.04	10SAN/NAV
	^3F	3	45 006.98	0.04	10SAN/NAV
	^3F	4	45 007.11	0.04	10SAN/NAV
	^1F	3	45 012.82	0.03	10SAN/NAV
5*s*13*d*	^1D	2	45 012.0249	0.0010	82BEI/LUC
	^3D	1	45 028.55	0.15	82BEI/LUC2
	^3D	2	45 036.95	0.15	82BEI/LUC2
	^3D	3	45 043.79	0.15	82BEI/LUC2
5*s*14*p*	^3P	0	45 043.18	0.02	79ARM/WYN
	^3P	1	45 043.89	0.02	79ARM/WYN
	^3P	2	45 045.54	0.02	79ARM/WYN
	^1P	1	45 075.29	0.03	10SAN/NAV

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
5*s*15*s*	^{3}S	1	45 120.41	0.15	82BEI/LUC2
	^{1}S	0	45 134.9242	0.0010	82BEI/LUC
5*s*14*d*	^{1}D	2	45 153.2785	0.0010	82BEI/LUC
	^{3}D	1	45 159.60	0.15	82BEI/LUC2
	^{3}D	2	45 171.49	0.15	82BEI/LUC2
	^{3}D	3	45 180.44	0.15	82BEI/LUC2
5*s*12*f*	^{3}F	2	45 155.92	0.04	10SAN/NAV
	^{3}F	3	45 156.01	0.04	10SAN/NAV
	^{3}F	4	45 156.08	0.04	10SAN/NAV
	^{1}F	3	45 160.29	0.03	10SAN/NAV
5*s*15*p*	^{3}P	0	45 183.93	0.02	79ARM/WYN
	^{3}P	1	45 184.54	0.02	79ARM/WYN
	^{3}P	2	45 185.79	0.02	79ARM/WYN
	^{1}P	1	45 207.83	0.04	10SAN/NAV
5*s*16*s*	^{3}S	1	45 243.88	0.15	82BEI/LUC2
	^{1}S	0	45 255.2295	0.0010	82BEI/LUC
5*s*15*d*	^{3}D	1	45 260.84	0.15	82BEI/LUC2
	^{3}D	2	45 276.65	0.15	82BEI/LUC2
	^{3}D	3	45 286.53	0.15	82BEI/LUC2
	^{1}D	2	45 263.6196	0.0010	82BEI/LUC
5*s*13*f*	^{3}F	2	45 271.72	0.04	10SAN/NAV
	^{3}F	3	45 271.69	0.04	10SAN/NAV
	^{3}F	4	45 271.78	0.04	10SAN/NAV
	^{1}F	3	45 274.97	0.03	10SAN/NAV
5*s*16*p*	^{3}P	1	45 294.22	0.02	79ARM/WYN
	^{3}P	2	45 295.21	0.02	79ARM/WYN
	^{1}P	1	45 311.99	0.04	10SAN/NAV
5*s*17*s*	^{3}S	1	45 341.28	0.15	82BEI/LUC2
	^{1}S	0	45 350.2296	0.0010	82BEI/LUC
5*s*16*d*	^{3}D	1	45 341.36	0.15	82BEI/LUC2
	^{3}D	2	45 350.35	0.15	82BEI/LUC2
	^{3}D	3	45 370.76	0.15	82BEI/LUC2
	^{1}D	2	45 362.1272	0.0010	82BEI/LUC
5*s*14*f*	^{3}F	2	45 363.22	0.04	10SAN/NAV
	^{3}F	3	45 363.43	0.04	10SAN/NAV
	^{3}F	4	45 363.35	0.04	10SAN/NAV
	^{1}F	3	45 365.90	0.03	10SAN/NAV
5*s*17*p*	^{3}P	1	45 381.46	0.03	79ARM/WYN
	^{3}P	2	45 382.26	0.03	79ARM/WYN
	^{1}P	1	45 395.34	0.04	10SAN/NAV
5*s*17*d*	^{3}D	1	45 414.43	0.15	82BEI/LUC2
	^{3}D	2	45 420.84	0.15	82BEI/LUC2
	^{3}D	3	45 439.08	0.15	82BEI/LUC2
	^{1}D	2	45 433.2717	0.0010	82BEI/LUC
5*s*18*s*	^{3}S	1	45 419.29	0.15	82BEI/LUC2
	^{1}S	0	45 426.5505	0.0010	82BEI/LUC

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
5*s*15*f*	^{3}F	2	45 437.09	0.04	10SAN/NAV
	^{3}F	3	45 437.10	0.04	10SAN/NAV
	^{3}F	4	45 437.11	0.04	10SAN/NAV
	^{1}F	3	45 439.16	0.03	10SAN/NAV
5*s*18*p*	^{3}P	1	45 451.87	0.01	79ARM/WYN
	^{3}P	2	45 452.53	0.01	79ARM/WYN
	^{1}P	1	45 463.02	0.05	10SAN/NAV
5*s*18*d*	^{3}D	1	45 475.35	0.15	82BEI/LUC2
	^{3}D	2	45 479.88	0.15	82BEI/LUC2
	^{3}D	3	45 495.02	0.15	82BEI/LUC2
	^{1}D	2	45 492.6101	0.0010	82BEI/LUC
5*s*19*s*	^{3}S	1	45 482.89	0.01	93KUN/HOH
	^{1}S	0	45 488.7860	0.0010	82BEI/LUC
5*s*16*f*	^{3}F	2	45 497.42	0.04	10SAN/NAV
	^{3}F	3	45 497.43	0.04	10SAN/NAV
	^{3}F	4	45 497.49	0.04	10SAN/NAV
	^{1}F	3	45 499.11	0.03	10SAN/NAV
5*s*19*p*	^{3}P	1	45 509.65	0.02	79ARM/WYN
	^{3}P	2	45 510.20	0.02	79ARM/WYN
	^{1}P	1	45 518.64	0.03	10SAN/NAV
5*s*19*d*	^{3}D	1	45 527.10	0.15	82BEI/LUC2
	^{3}D	2	45 530.18	0.15	82BEI/LUC2
	^{3}D	3	45 542.30	0.04	93KUN/HOH
	^{1}D	2	45 542.2955	0.0010	82BEI/LUC
5*s*20*s*	^{3}S	1	45 535.32	0.01	93KUN/HOH
	^{1}S	0	45 540.2024	0.0010	82BEI/LUC
5*s*17*f*	^{3}F	2	45 547.30	0.04	10SAN/NAV
	^{3}F	3	45 547.41	0.04	10SAN/NAV
	^{3}F	4	45 547.39	0.04	10SAN/NAV
	^{1}F	3	45 548.76	0.03	10SAN/NAV
5*s*20*p*	^{3}P	1	45 557.62	0.02	79ARM/WYN
	^{3}P	2	45 558.00	0.02	79ARM/WYN
	^{1}P	1	45 565.00	0.03	10SAN/NAV
5*s*20*d*	^{3}D	1	45 570.97	0.04	82BEI/LUC2
	^{3}D	2	45 573.28	0.04	82BEI/LUC2
	^{3}D	3	45 582.36	0.04	93KUN/HOH
	^{1}D	2	45 584.1831	0.0010	82BEI/LUC
5*s*18*f*	^{3}F	2	45 589.11	0.04	10SAN/NAV
	^{3}F	3	45 589.25	0.04	10SAN/NAV
	^{3}F	4	45 589.23	0.04	10SAN/NAV
	^{1}F	3	45 590.32	0.03	10SAN/NAV
5*s*19*f*	^{3}F	2	45 624.48	0.04	10SAN/NAV
	^{3}F	3	45 624.53	0.04	10SAN/NAV
	^{3}F	4	45 624.43	0.04	10SAN/NAV
	^{1}F	3	45 625.48	0.03	10SAN/NAV
5*s*20*f*	^{3}F	3	45 654.56	0.04	10SAN/NAV
	^{3}F	4	45 654.70	0.04	10SAN/NAV
	^{1}F	3	45 655.49	0.03	10SAN/NAV

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
Sr II(5*s* $^2S_{1/2}$)	*Limit*	—	45 932.2036	0.0010	82BEI/LUC
4*d*6*p*	^{3}D	1	49 409.86	0.14	10SAN/NAV
	^{3}P	1	49 547	5.	68GAR/COD
	^{3}D	2	49 558.30	0.12	10SAN/NAV
	^{3}D	3	49 665.77	0.14	10SAN/NAV
	^{3}P	2	49 732.0	0.5	10SAN/NAV
	^{1}P	1	51 099	5.	68GAR/COD
4*d*5*d*	^{3}F	2	51 036.49	0.05	73NEW/OCO
	^{3}F	3	51 150.30	0.05	73NEW/OCO
	^{3}F	4	51 254.06	0.05	73NEW/OCO
	^{1}D	2	51 356.00	0.24	73NEW/OCO
	^{3}P	1	51 439.66	0.17	73NEW/OCO
	^{3}P	2	51 555.06	0.10	73NEW/OCO
$4d(^2D_{3/2})4f$	^{2}[3/2]	1	53 253.0	0.6	68GAR/COD
	^{2}[7/2]	3	53 294.4	0.2	90KOM/COH
	^{2}[5/2]	3	53 392.6	0.2	90KOM/COH
$4d(^2D_{5/2})4f$	^{2}[3/2]	1	53 546.2	0.6	68GAR/COD
	^{2}[7/2]	3	53 572.3	0.2	90KOM/COH
	^{2}[5/2]	3	53 632.8	0.2	90KOM/COH
4*d*6*d*	(3/2,3/2)	1	54 139.2	0.2	92GOU/AYM
	(3/2,5/2)	2	54 140.5	0.2	92GOU/AYM
	(3/2,5/2)	1	54 308.5	0.2	92GOU/AYM
	(3/2,3/2)	2	54 891.30	0.20	73NEW/OCO
	(3/2,3/2)	0	54 999.9	0.2	91KOM/GOU
4*d*6*d*	(5/2,5/2)	1	54 469.5	0.2	92GOU/AYM
	(5/2,3/2)	3	55 033.33	0.05	73NEW/OCO
	(5/2,3/2)	2	55 088.2	0.2	92GOU/AYM
	(5/2,3/2)	1	55 113.7	0.2	92GOU/AYM
	(5/2,5/2)	4	55 119.40	0.15	73NEW/OCO
	(5/2,5/2)	2	55 234.2	0.2	92GOU/AYM
	(5/2,5/2)	0	55 428.3	0.2	91KOM/GOU
$5p^2$	^{1}S	0	54 451.0	30	91KOM/GOU
$4d(^2D_{3/2})7p$	^{2}[3/2]	1	54 728.7	0.6	68GAR/COD
$4d(^2D_{5/2})7p$	^{2}[3/2]	1	55 195.6	1.2	69HUD/CAR
4*d*8*s*	(3/2,1/2)	2	55 560	5.	92GOU/AYM
	(3/2,1/2)	1	55 557.5	0.6	92JIM/BOL
	(5/2,1/2)	2	55 802	30	92GOU/AYM
	(5/2,1/2)	3	55 824.4	0.6	93JIM/BOL
4*d*5*f*	(3/2,5/2)	1	55 847.3	0.6	68GAR/COD
	(3/2,5/2)	3	55 873.6	0.2	90KOM/COH
	(3/2,7/2)	3	55 972.5	0.2	90KOM/COH
4*d*5*f*	(5/2,5/2)	3	56 145.4	0.2	90KOM/COH
	(5/2,7/2)	3	56 211.9	0.2	90KOM/COH
	(5/2,5/2)	1	56 107.7	0.6	68GAR/COD
	(5/2,7/2)	1	56 169.6	0.6	68GAR/COD
$4d(^2D_{3/2})5g$	^{2}[5/2]	2	56 063.0	0.2	92GOU/AYM
$4d(^2D_{5/2})5g$	^{2}[5/2]	2	56 341.9	0.2	92GOU/AYM
	^{2}[3/2]	2	56 352.4	0.2	92GOU/AYM

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
4*d*7*d*	(3/2,3/2)	1	56 366.9	0.2	92GOU/AYM
	(3/2,5/2)	2	56 485.4	0.2	92GOU/AYM
	(3/2,3/2)	2	56 769.0	0.2	92GOU/AYM
	(3/2,3/2)	0	56 795.4	0.2	91KOM/GOU
4*d*7*d*	(5/2,3/2)	2	56 950.5	0.2	92GOU/AYM
	(5/2,5/2)	1	56 676.0	0.2	92GOU/AYM
	(5/2,5/2)	2	57 069.6	0.2	92GOU/AYM
	(5/2,5/2)	0	57 142.9	0.2	91KOM/GOU
$4d(^2D_{3/2})8p$	$^2[3/2]$	1	56 408.2	0.6	68GAR/COD
	$^2[1/2]$	1	56 610.1	0.6	68GAR/COD
$4d(^2D_{5/2})8p$	$^2[5/2]$	3	56 721.0	0.2	90KOM/COH
	$^2[3/2]$	1	56 940.5	1.8	69HUD/CAR
4*d*6*f*	(3/2,5/2)	1	57 235.5	0.7	68GAR/COD
	(3/2,5/2)	3	57 269.8	0.2	90KOM/COH
	(3/2,7/2)	3	57 364.1	0.2	90KOM/COH
4*d*6*f*	(5/2,5/2)	1	57 477.1	0.7	68GAR/COD
	(5/2,5/2)	3	57 535.3	0.2	90KOM/COH
	(5/2,7/2)	1	57 569.5	0.7	68GAR/COD
	(5/2,7/2)	3	57 591.9	0.2	90KOM/COH
$4d(^2D_{3/2})6g$	$^2[5/2]$	2	57 409.9	0.2	92GOU/AYM
$4d(^2D_{5/2})6g$	$^2[5/2]$	2	57 691.4	0.2	92GOU/AYM
	$^2[3/2]$	1	57 699.5	0.2	92GOU/AYM
	$^2[3/2]$	2	57 695.3	0.2	92GOU/AYM
4*d*8*d*	(3/2,5/2)	1	57 639.3	0.2	92GOU/AYM
	(3/2,5/2)	2	57 658.5	0.2	92GOU/AYM
	(3/2,3/2)	1	57 683.8	0.2	92GOU/AYM
	(3/2,3/2)	2	57 819.9	0.2	92GOU/AYM
	(3/2,3/2)	0	57 844.2	0.2	91KOM/GOU
4*d*8*d*	(5/2,5/2)	1	57 836.4	0.2	92GOU/AYM
	(5/2,3/2)	1	57 975.5	0.2	92GOU/AYM
	(5/2,3/2)	2	58 021.8	0.2	92GOU/AYM
	(5/2,5/2)	2	58 117.2	0.2	92GOU/AYM
	(5/2,5/2)	0	58 154.8	0.2	91KOM/GOU
4*d*9*p*	(3/2,3/2)	1	57 646.7	0.7	68GAR/COD
	(3/2,1/2)	1	57 743.2	0.7	68GAR/COD
4*d*9*p*	(5/2,1/2)	3	57 845.9	0.2	90KOM/COH
	(5/2,3/2)	3	57 917.0	0.2	90KOM/COH
	(5/2,3/2)	1	58 081.8	1.3	69HUD/CAR
4*d*10*s*	(3/2,1/2)	1	58 095.2	0.2	92GOU/AYM
4*d*7*f*	(3/2,5/2)	1	58 021.5	0.7	68GAR/COD
	(3/2,5/2)	3	58 106.7	0.2	90KOM/COH
	(3/2,7/2)	3	58 198.9	0.2	90KOM/COH
4*d*7*f*	(5/2,5/2)	1	58 287.0	0.7	68GAR/COD
	(5/2,5/2)	3	58 379.9	0.2	90KOM/COH
	(5/2,7/2)	1	58 422.3	0.7	68GAR/COD
	(5/2,7/2)	3	58 444.5	0.2	90KOM/COH

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
4*d*9*d*	(3/2,3/2)	1	58 378.1	0.2	92GOU/AYM
	(3/2,3/2)	2	58 498.0	0.2	92GOU/AYM
	(3/2,5/2)	1	58 417.1	0.2	92GOU/AYM
	(3/2,3/2)	0	58 431.1	0.2	91KOM/GOU
	(3/2,5/2)	2	58 443.4	0.2	92GOU/AYM
4*d*9*d*	(5/2,5/2)	1	58 642.0	0.2	92GOU/AYM
	(5/2,5/2)	2	58 763.8	0.2	92GOU/AYM
	(5/2,3/2)	1	58 666.5	0.2	92GOU/AYM
	(5/2,3/2)	2	58 687.0	0.2	92GOU/AYM
	(5/2,5/2)	0	58 709.9	0.2	91KOM/GOU
$4d(^2D_{3/2})10p$	$^2[1/2]$	1	58 396.2	0.7	68GAR/COD
	$^2[3/2]$	1	58 459.8	0.7	68GAR/COD
$4d(^2D_{5/2})10p$	$^2[7/2]$	3	58 646.9	0.2	90KOM/COH
	$^2[3/2]$	1	58 713.2	0.7	68GAR/COD
$4d(^2D_{5/2})7g$	$^2[5/2]$	2	58 508.3	0.2	92GOU/AYM
	$^2[3/2]$	2	58 510.6	0.2	92GOU/AYM
$4d(^2D_{3/2})8f$	$^2[3/2]$	1	58 618.3	0.7	68GAR/COD
	$^2[5/2]$	3	58 740.3	0.2	90KOM/COH
$4d(^2D_{5/2})8f$	$^2[1/2]$	1	58 926.5	0.7	68GAR/COD
	$^2[3/2]$	1	58 970.7	0.7	68GAR/COD
$4d(^2D_{3/2})8g$	$^2[5/2]$	2	58 755.1	0.2	92GOU/AYM
$4d(^2D_{5/2})8g$	$^2[5/2]$	2	59 037.1	0.2	92GOU/AYM
	$^2[3/2]$	2	59 038.3	0.2	92GOU/AYM
4*d*10*d*	(3/2,5/2)	1	58 821.2	0.2	92GOU/AYM
	(3/2,5/2)	2	58 889.7	0.2	92GOU/AYM
	(3/2,3/2)	0	58 856.2	0.2	91KOM/GOU
	(3/2,3/2)	1	58 859.0	0.2	92GOU/AYM
	(3/2,3/2)	2	58 939.7	0.2	92GOU/AYM
4*d*10*d*	(5/2,3/2)	2	59 087.5	0.2	92GOU/AYM
	(5/2,3/2)	1	59 165.1	0.2	92GOU/AYM
	(5/2,5/2)	1	59 137.4	0.2	92GOU/AYM
	(5/2,5/2)	2	59 223.5	0.2	92GOU/AYM
	(5/2,5/2)	0	59 258.8	0.2	91KOM/GOU
4*d*11*s*	(5/2,1/2)	2	58 929.8	2.	92GOU/AYM
	(3/2,1/2)	2	59 027.7	0.2	92GOU/AYM
$4d(^2D_{3/2})9f$	$^2[3/2]$	1	59 032.9	0.7	68GAR/COD
	$^2[7/2]$	3	59 105.6	0.2	90KOM/COH
$4d(^2D_{5/2})9f$	$^2[1/2]$	1	59 238.5	0.7	68GAR/COD
	$^2[3/2]$	1	59 360.5	0.7	68GAR/COD
$4d(^2D_{3/2})9g$	$^2[5/2]$	2	59 119.4	0.2	92GOU/AYM
$4d(^2D_{5/2})9g$	$^2[5/2]$	2	59 400.6	0.2	92GOU/AYM
	$^2[3/2]$	2	59 401.5	0.2	92GOU/AYM
$4d(^2D_{3/2})10f$	$^2[3/2]$	1	59 360.5	0.7	68GAR/COD
$4d(^2D_{5/2})10f$	$^2[3/2]$	1	59 661.2	0.7	68GAR/COD
$4d(^2D_{5/2})10g$	$^2[5/2]$	2	59 661.3	0.2	92GOU/AYM
	$^2[3/2]$	2	59 661.7	0.2	92GOU/AYM

TABLE 3. Energy levels of Sr I—Continued

Designation	Term	J	Energy (cm^{-1})	Uncertainty (cm^{-1})	Reference
Sr II($4d\ ^2D_{3/2}$)	*Limit*	—	60 488.09	0.20	78RUB/BOR
Sr II($4d\ ^2D_{5/2}$)	*Limit*	—	60 768.43	0.20	78RUB/BOR

5. Wavelengths and Transition Probabilities

In Table 4 we list the most accurate wavelengths observed for each transition. The wavelengths reported here are given in Ångströms, with uncertainties as reported by the original authors. Lines with wavelengths below 2000 or above 10 000 Å are given as vacuum wavelengths and those between 2000 and 10 000 Å as air wavelengths. The index of refraction used for conversions is obtained using the three-term formula of Peck and Reeder [72PEC/REE]. The wave number of the transition is given in units of cm^{-1} and the uncertainties of the wave numbers can be calculated from those of the wavelengths.

The intensities listed are those reported by the original investigator. Since, in general, there is no way to normalize data taken from different sources, this means that intensities taken from different sources are not on the same scale and should not be used for comparison. Intensities marked by an asterisk indicate that the measured spectral line either is blended with another line or has two identifications. In either case the intensity cannot be assumed to be entirely due to the transition indicated in the classification. Many of the transitions have line codes, which indicate additional descriptive information about the appearance of the spectral line. In general, the character of a line depends on the light source used and the resolution of the spectrometer. For ease of use we utilize a uniform set of line codes to describe the line characteristics provided by various authors. They have the following meanings:

- bl = blend
- h = hazy
- l = shaded to longer wavelengths
- r = easily self-reversed
- s = shaded to shorter wavelengths
- w = wide
- * = intensity may be affected by nearby line

There is a considerable body of work on transition probabilities for the Sr I spectrum, largely based on experimental observations. The lifetime of the $5s5p\ ^1P_1$ level was measured by Lurio *et al.* [64LUR/DEZ]. Oscillator strengths for resonance transitions from the $5snp\ ^1P_1$ levels were reported by Penkin and Shabanova [62PEN/SHA] and by Kelly *et al.* [73KEL/KOH, 73KEL/KOH2, 73DIC/KEL, 74KEL/KOH, 75KEL/KOH, 80KEL/MAT] and Parkinson *et al.* [76PAR/REE]. The latter also reported a value for the spin-forbidden resonance transitions from $5s5p\ ^3P_1$, which was later improved by lifetime measurements of Havey *et al.* [76HAV/BAL, 77HAV/BAL] and Drozdowski *et al.* [97DRO/IGN]. The transition rate of the transition from the $4d5p\ ^1P_1$ level to the ground state was first measured by Parkinson *et al.* [76PAR/REE]. Penkin and Shabanova [62PEN/SHA] measured oscillator strengths for several transitions ending on $5s5p\ ^3P$ levels. Lifetimes of the $5p^2\ ^3P$ and $4d^2\ ^3P$ levels were measured by Kelly and Matur [76KEL/MAT, 79KEL/MAT], who also renormalized oscillator strengths measured earlier for decay transitions from those levels. Using magneto-optical rotation, Garton *et al.* [83GAR/CON] measured oscillator strengths for several additional $5snp\ ^1P_1$ resonance lines. For several $5s4d\ ^1D_2$-$5snf\ ^1F_3$ transitions we include the transition probabilities obtained by Vaeck *et al.* [88VAE/GOD] using multiconfiguration Hartree–Fock calculations. García and Campos [88GAR/CAM] determined transition probabilities for lines arising from triplet levels of $5s5d$, $5s4f$, $5s5p$, $5p^2$, $5s6s$, $5s6p$, and $5s7s$ by combining emission line intensities with experimental lifetimes measured by other groups. A similar experiment by Werij *et al.* [92WER/GRE] produced transition rates for many additional transitions. The oscillator strength for the $5s20p\ ^1P_1$ resonance line was taken from Connerade *et al.* [92CON/FAR].

The Sr I transition probabilities (A_{ki}) for transitions from the upper state (k) to the lower (i) are listed in Table 4 in units of s^{-1}. Exponential notation is used for these values; thus, for example, 3.2(11)E+5 stands for a value of $3.2 \times 10^5\ s^{-1}$ with an uncertainty of $\pm 1.1 \times 10^5\ s^{-1}$. The "Lower level" and "Upper level" columns indicate the classification given for the transition. References for the wavelength measurement and transition probability are given in the "λ Ref." and "A_{ki} Ref." columns, respectively.

TABLE 4. Spectral lines of Sr I

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
vacuum									
1 676.13	0.02	59 661.2				$5s^2\ ^1S_0$	$4d(^2D_{5/2})10f\ ^2[3/2]_1$	68GAR/COD	
1 684.62	0.02	59 360.5		*		$5s^2\ ^1S_0$	$4d(^2D_{5/2})9f\ ^2[3/2]_1$	68GAR/COD	
1 684.62	0.02	59 360.5		*		$5s^2\ ^1S_0$	$4d(^2D_{3/2})10f\ ^2[3/2]_1$	68GAR/COD	

TABLE 4. Spectral lines of Sr I—Continued

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
1 688.09	0.02	59 238.5				$5s^2\ ^1S_0$	$4d(^2D_{5/2})9f\ ^2[1/2]_1$	68GAR/COD	
1 693.97	0.02	59 032.9				$5s^2\ ^1S_0$	$4d(^2D_{3/2})9f\ ^2[3/2]_1$	68GAR/COD	
1 695.76	0.02	58 970.7				$5s^2\ ^1S_0$	$4d(^2D_{5/2})8f\ ^2[3/2]_1$	68GAR/COD	
1 697.03	0.02	58 926.5				$5s^2\ ^1S_0$	$4d(^2D_{5/2})8f\ ^2[1/2]_1$	68GAR/COD	
1 703.20	0.02	58 713.2				$5s^2\ ^1S_0$	$4d(^2D_{5/2})10p\ ^2[3/2]_1$	68GAR/COD	
1 705.95	0.02	58 618.3				$5s^2\ ^1S_0$	$4d(^2D_{3/2})8f\ ^2[3/2]_1$	68GAR/COD	
1 710.58	0.02	58 459.8				$5s^2\ ^1S_0$	$4d(^2D_{3/2})10p\ ^2[3/2]_1$	68GAR/COD	
1 711.67	0.02	58 422.3				$5s^2\ ^1S_0$	$4d7f\ (5/2,7/2)_1$	68GAR/COD	
1 712.44	0.02	58 396.2				$5s^2\ ^1S_0$	$4d(^2D_{3/2})10p\ ^2[1/2]_1$	68GAR/COD	
1 715.65	0.02	58 287.0				$5s^2\ ^1S_0$	$4d7f\ (5/2,5/2)_1$	68GAR/COD	
1 721.71	0.04	58 081.8				$5s^2\ ^1S_0$	$4d9p\ (5/2,3/2)_1$	69HUD/CAR	
1 723.50	0.02	58 021.5				$5s^2\ ^1S_0$	$4d7f\ (3/2,5/2)_1$	68GAR/COD	
1 731.81	0.02	57 743.2				$5s^2\ ^1S_0$	$4d9p\ (3/2,1/2)_1$	68GAR/COD	
1 734.71	0.02	57 646.7				$5s^2\ ^1S_0$	$4d9p\ (3/2,3/2)_1$	68GAR/COD	
1 737.03	0.02	57 569.5				$5s^2\ ^1S_0$	$4d6f\ (5/2,7/2)_1$	68GAR/COD	
1 739.82	0.02	57 477.1				$5s^2\ ^1S_0$	$4d6f\ (5/2,5/2)_1$	68GAR/COD	
1 747.17	0.02	57 235.5				$5s^2\ ^1S_0$	$4d6f\ (3/2,5/2)_1$	68GAR/COD	
1 756.22	0.04	56 940.5				$5s^2\ ^1S_0$	$4d(^2D_{5/2})8p\ ^2[3/2]_1$	69HUD/CAR	
1 766.47	0.02	56 610.1				$5s^2\ ^1S_0$	$4d(^2D_{3/2})8p\ ^2[3/2]_1$	68GAR/COD	
1 772.79	0.02	56 408.2				$5s^2\ ^1S_0$	$4d(^2D_{3/2})8p\ ^2[1/2]_1$	68GAR/COD	
1 780.32	0.02	56 169.6				$5s^2\ ^1S_0$	$4d5f\ (5/2,7/2)_1$	68GAR/COD	
1 782.29	0.02	56 107.7				$5s^2\ ^1S_0$	$4d5f\ (5/2,5/2)_1$	68GAR/COD	
1 790.60	0.02	55 847.3				$5s^2\ ^1S_0$	$4d5f\ (3/2,5/2)_1$	68GAR/COD	
1 811.74	0.04	55 195.6				$5s^2\ ^1S_0$	$4d(^2D_{5/2})7p\ ^2[3/2]_1$	69HUD/CAR	
1 827.19	0.02	54 728.7				$5s^2\ ^1S_0$	$4d(^2D_{3/2})7p\ ^2[3/2]_1$	68GAR/COD	
1 867.55	0.02	53 546.2				$5s^2\ ^1S_0$	$4d(^2D_{5/2})4f\ ^2[3/2]_1$	68GAR/COD	
1 877.83	0.02	53 253.0				$5s^2\ ^1S_0$	$4d(^2D_{3/2})4f\ ^2[3/2]_1$	68GAR/COD	
1 957.0	0.2	51 099				$5s^2\ ^1S_0$	$4d6p\ ^1P_1$	68GAR/COD	
air									
2 017.6	0.2	49 547				$5s^2\ ^1S_0$	$4d6p\ ^3P_1$	68GAR/COD	
2 023.21	0.02	49 410.5				$5s^2\ ^1S_0$	$4d6p\ ^3D_1$	68GAR/COD	
2 193.977	0.004	45 565.08			2.56(15)E+5	$5s^2\ ^1S_0$	$5s20p\ ^1P_1$	68GAR/COD	92CON/FAR
2 196.214	0.004	45 518.69			3.2(4)E+5	$5s^2\ ^1S_0$	$5s19p\ ^1P_1$	68GAR/COD	83GAR/CON
2 197.664	0.009	45 488.66				$5s^2\ ^1S_0$	$5s19s\ ^1S_0$	07PHI/CON	
2 198.892	0.004	45 463.25			4.2(5)E+5	$5s^2\ ^1S_0$	$5s18p\ ^1P_1$	68GAR/COD	83GAR/CON
2 200.663	0.009	45 426.67				$5s^2\ ^1S_0$	$5s18s\ ^1S_0$	07PHI/CON	
2 202.176	0.004	45 395.47			5.0(6)E+5	$5s^2\ ^1S_0$	$5s17p\ ^1P_1$	68GAR/COD	83GAR/CON
2 204.362	0.009	45 350.45				$5s^2\ ^1S_0$	$5s17s\ ^1S_0$	07PHI/CON	
2 206.239	0.004	45 311.87			6.4(8)E+5	$5s^2\ ^1S_0$	$5s16p\ ^1P_1$	68GAR/COD	83GAR/CON
2 209.011	0.009	45 255.02				$5s^2\ ^1S_0$	$5s16s\ ^1S_0$	07PHI/CON	
2 211.310	0.004	45 207.98			8.5(10)E+5	$5s^2\ ^1S_0$	$5s15p\ ^1P_1$	68GAR/COD	83GAR/CON
2 214.885	0.009	45 135.01				$5s^2\ ^1S_0$	$5s15s\ ^1S_0$	07PHI/CON	
2 217.816	0.004	45 075.36			1.17(14)E+6	$5s^2\ ^1S_0$	$5s14p\ ^1P_1$	68GAR/COD	83GAR/CON
2 222.564	0.009	44 979.09				$5s^2\ ^1S_0$	$5s14s\ ^1S_0$	07PHI/CON	
2 226.304	0.004	44 903.54			1.57(19)E+6	$5s^2\ ^1S_0$	$5s13p\ ^1P_1$	68GAR/COD	83GAR/CON
2 232.771	0.009	44 773.48				$5s^2\ ^1S_0$	$5s13s\ ^1S_0$	07PHI/CON	
2 234.971	0.009	44 729.42				$5s^2\ ^1S_0$	$4d^2\ ^3P_2$	07PHI/CON	
2 237.655	0.004	44 675.77			2.4(3)E+6	$5s^2\ ^1S_0$	$5s12p\ ^1P_1$	68GAR/COD	83GAR/CON
2 245.173	0.009	44 526.18				$5s^2\ ^1S_0$	$4d^2\ ^3P_0$	07PHI/CON	
2 246.863	0.009	44 492.69				$5s^2\ ^1S_0$	$5s12s\ ^1S_0$	07PHI/CON	
2 253.256	0.004	44 366.48			3.7(4)E+6	$5s^2\ ^1S_0$	$5s11p\ ^1P_1$	68GAR/COD	83GAR/CON
2 275.304	0.004	43 936.60			6.6(8)E+6	$5s^2\ ^1S_0$	$5s10p\ ^1P_1$	68GAR/COD	76PAR/REE
2 307.264	0.004	43 328.04			1.15(17)E+7	$5s^2\ ^1S_0$	$5s9p\ ^1P_1$	68GAR/COD	76PAR/REE
2 354.319	0.0008	42 462.136			1.8(3)E+7	$5s^2\ ^1S_0$	$5s8p\ ^1P_1$	38SUL	76PAR/REE
2 428.095	0.0008	41 172.053			1.7(3)E+7	$5s^2\ ^1S_0$	$4d5p\ ^1P_1$	38SUL	76PAR/REE
2 569.469	0.0009	38 906.890	20		5.3(6)E+6	$5s^2\ ^1S_0$	$5s7p\ ^1P_1$	38SUL	76PAR/REE
2 931.830	0.0010	34 098.414	30		1.9(3)E+6	$5s^2\ ^1S_0$	$5s6p\ ^1P_1$	38SUL	76PAR/REE

TABLE 4. Spectral lines of Sr I—Continued

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
3 172.28	0.02	31 513.9		w		$4d5s\ ^3D_2$	$4d6p\ ^3P_2$	68GAR/COD	
3 179.03	0.02	31 447.0				$4d5s\ ^3D_2$	$4d6p\ ^3D_3$	68GAR/COD	
3 182.58	0.02	31 412.0		w		$4d5s\ ^3D_3$	$4d6p\ ^3P_2$	68GAR/COD	
3 183.87	0.02	31 399.2				$4d5s\ ^3D_1$	$4d6p\ ^3D_2$	68GAR/COD	
3 189.23	0.02	31 346.5				$4d5s\ ^3D_3$	$4d6p\ ^3D_3$	68GAR/COD	
3 189.94	0.02	31 339.5				$4d5s\ ^3D_2$	$4d6p\ ^3D_2$	68GAR/COD	
3 199.00	0.02	31 250.8				$4d5s\ ^3D_1$	$4d6p\ ^3D_1$	68GAR/COD	
3 200.20	0.02	31 239.1				$4d5s\ ^3D_3$	$4d6p\ ^3D_2$	68GAR/COD	
3 205.11	0.02	31 191.1				$4d5s\ ^3D_2$	$4d6p\ ^3D_1$	68GAR/COD	
3 301.734	0.0011	30 278.398	50	h	5.9(9)E+7	$5s5p\ ^3P_0$	$4d^2\ ^3P_1$	38SUL	76KEL/MAT
3 307.534	0.0011	30 225.304	50			$5s5p\ ^3P_1$	$4d^2\ ^3P_2$	38SUL	
3 322.231	0.0011	30 091.597	30			$5s5p\ ^3P_1$	$4d^2\ ^3P_1$	38SUL	
3 329.988	0.0011	30 021.503	30			$5s5p\ ^3P_1$	$4d^2\ ^3P_0$	38SUL	
3 351.246	0.0011	29 831.073	150			$5s5p\ ^3P_2$	$4d^2\ ^3P_2$	38SUL	
3 366.333	0.0011	29 697.383	50			$5s5p\ ^3P_2$	$4d^2\ ^3P_1$	38SUL	
3 499.672	0.0012	28 565.934	20	h		$5s5p\ ^3P_1$	$5s8d\ ^3D_2$	38SUL	
3 548.083	0.0012	28 176.183	15	h		$5s5p\ ^3P_2$	$5s8d\ ^3D_3$	38SUL	
3 577.243	0.0012	27 946.511	2	h		$5s5p\ ^3P_1$	$5s9s\ ^3S_1$	38SUL	
3 628.345	0.0012	27 552.920	3	h		$5s5p\ ^3P_2$	$5s9s\ ^3S_1$	38SUL	
3 629.144	0.0012	27 546.854	10	h		$5s5p\ ^3P_0$	$5s7d\ ^3D_1$	38SUL	
3 639.902	0.005	27 465.439	3			$5s4d\ ^3D_1$	$5s19f\ ^3F_2$	78RUB/BOR	
3 643.838	0.005	27 435.773	4	*		$5s4d\ ^3D_2$	$5s20f\ ^3F_3$	78RUB/BOR	
3 644.595	0.005	27 430.074	3			$5s4d\ ^3D_1$	$5s18f\ ^3F_2$	78RUB/BOR	
3 647.830	0.005	27 405.749	5			$5s4d\ ^3D_2$	$5s19f\ ^3F_3$	78RUB/BOR	
3 650.159	0.005	27 388.263	4			$5s4d\ ^3D_1$	$5s17f\ ^3F_2$	78RUB/BOR	
3 652.533	0.005	27 370.462	5			$5s4d\ ^3D_2$	$5s18f\ ^3F_3$	78RUB/BOR	
3 653.270	0.0012	27 364.941	12	h		$5s5p\ ^3P_1$	$5s7d\ ^3D_2$	38SUL	
3 653.928	0.0012	27 360.013	3	h		$5s5p\ ^3P_1$	$5s7d\ ^3D_1$	38SUL	
3 656.819	0.005	27 338.383	4			$5s4d\ ^3D_1$	$5s16f\ ^3F_2$	78RUB/BOR	
3 657.213	0.005	27 335.438	4			$5s4d\ ^3D_3$	$5s20f\ ^3F_4$	78RUB/BOR	
3 658.125	0.005	27 328.624	6			$5s4d\ ^3D_2$	$5s17f\ ^3F_3$	78RUB/BOR	
3 661.267	0.005	27 305.171	6			$5s4d\ ^3D_3$	$5s19f\ ^3F_4$	78RUB/BOR	
3 664.827	0.005	27 278.648	6			$5s4d\ ^3D_2$	$5s16f\ ^3F_3$	78RUB/BOR	
3 664.907	0.005	27 278.053	5			$5s4d\ ^3D_1$	$5s15f\ ^3F_2$	78RUB/BOR	
3 665.993	0.005	27 269.972	7			$5s4d\ ^3D_3$	$5s18f\ ^3F_4$	78RUB/BOR	
3 671.627	0.005	27 228.128	7			$5s4d\ ^3D_3$	$5s17f\ ^3F_4$	78RUB/BOR	
3 672.951	0.005	27 218.313	7			$5s4d\ ^3D_2$	$5s15f\ ^3F_3$	78RUB/BOR	
3 674.859	0.005	27 204.182	4			$5s4d\ ^3D_1$	$5s14f\ ^3F_2$	78RUB/BOR	
3 678.368	0.005	27 178.231	8			$5s4d\ ^3D_3$	$5s16f\ ^3F_4$	78RUB/BOR	
3 682.919	0.005	27 144.648	7			$5s4d\ ^3D_2$	$5s14f\ ^3F_3$	78RUB/BOR	
3 686.559	0.005	27 117.847	8			$5s4d\ ^3D_3$	$5s15f\ ^3F_4$	78RUB/BOR	
3 687.261	0.005	27 112.684	4			$5s4d\ ^3D_1$	$5s13f\ ^3F_2$	78RUB/BOR	
3 695.409	0.005	27 052.905	8			$5s4d\ ^3D_2$	$5s13f\ ^3F_3$	78RUB/BOR	
3 696.613	0.005	27 044.094	8			$5s4d\ ^3D_3$	$5s14f\ ^3F_4$	78RUB/BOR	
3 703.078	0.005	26 996.880	5			$5s4d\ ^3D_1$	$5s12f\ ^3F_2$	78RUB/BOR	
3 705.901	0.0012	26 976.315	15	h		$5s5p\ ^3P_2$	$5s7d\ ^3D_3$	38SUL	
3 706.674	0.005	26 970.690	10			$5s5p\ ^3P_2$	$5s7d\ ^3D_2$	78RUB/BOR	
3 709.173	0.005	26 952.519	8			$5s4d\ ^3D_3$	$5s13f\ ^3F_4$	78RUB/BOR	
3 711.279	0.005	26 937.225	7			$5s4d\ ^3D_2$	$5s12f\ ^3F_3$	78RUB/BOR	
3 723.628	0.005	26 847.893	4			$5s4d\ ^3D_1$	$5s11f\ ^3F_2$	78RUB/BOR	
3 725.165	0.005	26 836.816	10			$5s4d\ ^3D_3$	$5s12f\ ^3F_4$	78RUB/BOR	
3 731.926	0.005	26 788.198	9			$5s4d\ ^3D_2$	$5s11f\ ^3F_3$	78RUB/BOR	
3 745.958	0.005	26 687.854	10			$5s4d\ ^3D_3$	$5s11f\ ^3F_4$	78RUB/BOR	
3 751.070	0.005	26 651.485	6			$5s4d\ ^3D_1$	$5s10f\ ^3F_2$	78RUB/BOR	
3 759.493	0.005	26 591.775	9			$5s4d\ ^3D_2$	$5s10f\ ^3F_3$	78RUB/BOR	
3 773.730	0.005	26 491.455	10			$5s4d\ ^3D_3$	$5s10f\ ^3F_4$	78RUB/BOR	
3 780.527	0.0013	26 443.828				$5s5p\ ^3P_0$	$5s8s\ ^3S_1$	38SUL	

TABLE 4. Spectral lines of Sr I—Continued

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
3 788.918	0.005	26 385.266	8			$5s4d\ ^3D_1$	$5s9f\ ^3F_2$	78RUB/BOR	
3 797.502	0.005	26 325.625	10			$5s4d\ ^3D_2$	$5s9f\ ^3F_3$	78RUB/BOR	
3 797.526	0.005	26 325.459	3			$5s4d\ ^3D_2$	$5s9f\ ^3F_2$	78RUB/BOR	
3 807.424	0.0013	26 257.024				$5s5p\ ^3P_1$	$5s8s\ ^3S_1$	38SUL	
3 812.020	0.005	26 225.367	8			$5s4d\ ^3D_3$	$5s9f\ ^3F_4$	78RUB/BOR	
3 812.044	0.005	26 225.202	2			$5s4d\ ^3D_3$	$5s9f\ ^3F_3$	78RUB/BOR	
3 843.325	0.005	26 011.759	8			$5s4d\ ^3D_1$	$5s8f\ ^3F_2$	78RUB/BOR	
3 852.144	0.005	25 952.210	10			$5s4d\ ^3D_2$	$5s8f\ ^3F_3$	78RUB/BOR	
3 865.451	0.0013	25 862.870				$5s5p\ ^3P_2$	$5s8s\ ^3S_1$	38SUL	
3 867.067	0.005	25 852.063	10			$5s4d\ ^3D_3$	$5s8f\ ^3F_4$	78RUB/BOR	
3 919.566	0.005	25 505.806	7			$5s4d\ ^1D_2$	$5s20f\ ^1F_3$	78RUB/BOR	
3 924.184	0.005	25 475.791	8			$5s4d\ ^1D_2$	$5s19f\ ^1F_3$	78RUB/BOR	
3 925.872	0.005	25 464.838	8			$5s4d\ ^3D_1$	$5s7f\ ^3F_2$	78RUB/BOR	
3 929.607	0.005	25 440.634	8			$5s4d\ ^1D_2$	$5s18f\ ^1F_3$	78RUB/BOR	
3 933.523	0.005	25 415.308	3			$5s4d\ ^1D_2$	$5s20p\ ^1P_1$	78RUB/BOR	
3 935.056	0.005	25 405.407	8			$5s4d\ ^3D_2$	$5s7f\ ^3F_3$	78RUB/BOR	
3 935.099	0.005	25 405.129	2			$5s4d\ ^3D_2$	$5s7f\ ^3F_2$	78RUB/BOR	
3 936.037	0.005	25 399.075	7			$5s4d\ ^1D_2$	$5s17f\ ^1F_3$	78RUB/BOR	
3 940.711	0.005	25 368.950	4			$5s4d\ ^1D_2$	$5s19p\ ^1P_1$	78RUB/BOR	
3 940.800	0.0013	25 368.377	20			$5s5p\ ^3P_0$	$5s6d\ ^3D_1$	38SUL	
3 943.747	0.005	25 349.421	6			$5s4d\ ^1D_2$	$5s16f\ ^1F_3$	78RUB/BOR	
3 949.374	0.005	25 313.304	3			$5s4d\ ^1D_2$	$5s18p\ ^1P_1$	78RUB/BOR	
3 950.636	0.0013	25 305.218				$5s4d\ ^3D_3$	$5s7f\ ^3F_4$	38SUL	
3 950.670	0.005	25 305.001	3			$5s4d\ ^3D_3$	$5s7f\ ^3F_3$	78RUB/BOR	
3 953.095	0.005	25 289.478	6			$5s4d\ ^1D_2$	$5s15f\ ^1F_3$	78RUB/BOR	
3 959.961	0.005	25 245.630	3			$5s4d\ ^1D_2$	$5s17p\ ^1P_1$	78RUB/BOR	
3 962.611	0.0013	25 228.748				$5s5p\ ^3P_1$	$5s6d\ ^1D_2$	38SUL	
3 964.581	0.005	25 216.212	5			$5s4d\ ^1D_2$	$5s14f\ ^1F_3$	78RUB/BOR	
3 969.261	0.0013	25 186.481	30			$5s5p\ ^3P_1$	$5s6d\ ^3D_2$	38SUL	
3 970.043	0.0013	25 181.520	20			$5s5p\ ^3P_1$	$5s6d\ ^3D_1$	38SUL	
3 973.072	0.005	25 162.323	4			$5s4d\ ^1D_2$	$5s16p\ ^1P_1$	78RUB/BOR	
3 978.929	0.005	25 125.284	6			$5s4d\ ^1D_2$	$5s13f\ ^1F_3$	78RUB/BOR	
3 989.593	0.005	25 058.127	6			$5s4d\ ^1D_2$	$5s15p\ ^1P_1$	78RUB/BOR	
3 997.174	0.005	25 010.603	7			$5s4d\ ^1D_2$	$5s12f\ ^1F_3$	78RUB/BOR	
4 010.806	0.005	24 925.598	8			$5s4d\ ^1D_2$	$5s14p\ ^1P_1$	78RUB/BOR	
4 020.882	0.005	24 863.138	8			$5s4d\ ^1D_2$	$5s11f\ ^1F_3$	78RUB/BOR	
4 030.377	0.0013	24 804.565	40			$5s5p\ ^3P_2$	$5s6d\ ^3D_3$	38SUL	
4 032.379	0.0013	24 792.251	20			$5s5p\ ^3P_2$	$5s6d\ ^3D_2$	38SUL	
4 033.181	0.005	24 787.321	2			$5s5p\ ^3P_2$	$5s6d\ ^3D_1$	78RUB/BOR	
4 033.191	0.0013	24 787.259	6			$5s5p\ ^3P_2$	$5s6d\ ^3D_1$	38SUL	
4 038.642	0.005	24 753.804	8			$5s4d\ ^1D_2$	$5s13p\ ^1P_1$	78RUB/BOR	
4 052.512	0.005	24 669.085	9			$5s4d\ ^1D_2$	$5s10f\ ^1F_3$	78RUB/BOR	
4 060.923	0.005	24 617.991	8			$5s4d\ ^3D_1$	$5s6f\ ^3F_2$	78RUB/BOR	
4 070.718	0.005	24 558.756	9			$5s4d\ ^3D_2$	$5s6f\ ^3F_3$	78RUB/BOR	
4 070.805	0.005	24 558.231	7			$5s4d\ ^3D_2$	$5s6f\ ^3F_2$	78RUB/BOR	
4 076.147	0.005	24 526.047	8			$5s4d\ ^1D_2$	$5s12p\ ^1P_1$	78RUB/BOR	
4 087.344	0.0013	24 458.861	12	r		$5s4d\ ^3D_3$	$5s6f\ ^3F_4$	38SUL	
4 087.442	0.005	24 458.275	5			$5s4d\ ^3D_3$	$5s6f\ ^3F_3$	78RUB/BOR	
4 096.063	0.005	24 406.798	10			$5s4d\ ^1D_2$	$5s9f\ ^1F_3$	78RUB/BOR	
4 128.213	0.005	24 216.725	9			$5s4d\ ^1D_2$	$5s11p\ ^1P_1$	78RUB/BOR	
4 158.526	0.005	24 040.204	10			$5s4d\ ^1D_2$	$5s8f\ ^1F_3$	78RUB/BOR	
4 185.424	0.005	23 885.711	8			$5s5p\ ^1P_1$	$5s20d\ ^1D_2$	78RUB/BOR	
4 192.777	0.005	23 843.822	8			$5s5p\ ^1P_1$	$5s19d\ ^1D_2$	78RUB/BOR	
4 193.148	0.005	23 841.713	4			$5s5p\ ^1P_1$	$5s20s\ ^1S_0$	78RUB/BOR	
4 201.534	0.005	23 794.127	8			$5s5p\ ^1P_1$	$5s18d\ ^1D_2$	78RUB/BOR	
4 202.209	0.005	23 790.305	6			$5s5p\ ^1P_1$	$5s19s\ ^1S_0$	78RUB/BOR	
4 202.522	0.0014	23 788.533	6			$5s4d\ ^1D_2$	$5s10p\ ^1P_1$	38SUL	

TABLE 4. Spectral lines of Sr I—Continued

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
4 203.780	0.005	23 781.415	4			$5s5p\ ^1P_1$	$5s18d\ ^3D_2$	78RUB/BOR	
4 212.036	0.005	23 734.802	10			$5s5p\ ^1P_1$	$5s17d\ ^1D_2$	78RUB/BOR	
4 213.230	0.005	23 728.075	6			$5s5p\ ^1P_1$	$5s18s\ ^1S_0$	78RUB/BOR	
4 214.246	0.005	23 722.355	6			$5s5p\ ^1P_1$	$5s17d\ ^3D_2$	78RUB/BOR	
4 224.698	0.005	23 663.666	10			$5s5p\ ^1P_1$	$5s16d\ ^1D_2$	78RUB/BOR	
4 226.771	0.005	23 652.061	6			$5s5p\ ^1P_1$	$5s16d\ ^3D_2$	78RUB/BOR	
4 226.826	0.005	23 651.753	6			$5s5p\ ^1P_1$	$5s17s\ ^1S_0$	78RUB/BOR	
4 240.010	0.005	23 578.211	8			$5s5p\ ^1P_1$	$5s15d\ ^3D_2$	78RUB/BOR	
4 242.399	0.005	23 564.934	9			$5s5p\ ^1P_1$	$5s15d\ ^1D_2$	78RUB/BOR	
4 243.868	0.005	23 556.777	7			$5s5p\ ^1P_1$	$5s16s\ ^1S_0$	78RUB/BOR	
4 252.939	0.005	23 506.534	10		7.7(19)E+6	$5s4d\ ^1D_2$	$5s7f\ ^1F_3$	78RUB/BOR	88VAE/GOD
4 258.745	0.005	23 474.488	2			$5s4d\ ^1D_2$	$5s7f\ ^3F_3$	78RUB/BOR	
4 259.013	0.005	23 473.011	5			$5s5p\ ^1P_1$	$5s14d\ ^3D_2$	78RUB/BOR	
4 262.32	0.005	23 454.800	9			$5s5p\ ^1P_1$	$5s14d\ ^1D_2$	78RUB/BOR	
4 265.660	0.005	23 436.435	7			$5s5p\ ^1P_1$	$5s15s\ ^1S_0$	78RUB/BOR	
4 288.145	0.005	23 313.548	8			$5s5p\ ^1P_1$	$5s13d\ ^1D_2$	78RUB/BOR	
4 294.148	0.005	23 280.957	7			$5s5p\ ^1P_1$	$5s14s\ ^1S_0$	78RUB/BOR	
4 308.105	0.0014	23 205.535	20	h		$5s4d\ ^3D_1$	$5s5f\ ^3F_2$	38SUL	
4 313.182	0.0014	23 178.220	3	h	1.3(4)E+7	$5s4d\ ^1D_2$	$5s9p\ ^1P_1$	38SUL	92WER/GRE
4 319.053	0.0014	23 146.714	25	h		$5s4d\ ^3D_2$	$5s5f\ ^3F_3$	38SUL	
4 319.220	0.005	23 145.819	3			$5s4d\ ^3D_2$	$5s5f\ ^3F_2$	78RUB/BOR	
4 321.953	0.005	23 131.183	7			$5s5p\ ^1P_1$	$5s12d\ ^1D_2$	78RUB/BOR	
4 326.445	0.0014	23 107.167	8		3.1(2)E+6	$5s5p\ ^3P_0$	$5s7s\ ^3S_1$	38SUL	88GAR/CAM
4 332.439	0.005	23 075.199	7			$5s5p\ ^1P_1$	$5s13s\ ^1S_0$	78RUB/BOR	
4 337.664	0.0014	23 047.404	30	h		$5s4d\ ^3D_3$	$5s5f\ ^3F_4$	38SUL	
4 337.891	0.005	23 046.198	4			$5s4d\ ^3D_3$	$5s5f\ ^3F_3$	78RUB/BOR	
4 340.75	0.04	23 031.0				$5s5p\ ^1P_1$	$4d^2\ ^3P_2$	77ESH	
4 361.710	0.0014	22 920.346	20		9.7(8)E+6	$5s5p\ ^3P_1$	$5s7s\ ^3S_1$	38SUL	88GAR/CAM
4 366.20	0.04	22 896.8				$5s5p\ ^1P_1$	$4d^2\ ^3P_1$	77ESH	
4 369.365	0.005	22 880.191	8			$5s5p\ ^1P_1$	$5s11d\ ^1D_2$	78RUB/BOR	
4 379.47	0.04	22 827.4				$5s5p\ ^1P_1$	$4d^2\ ^3P_0$	77ESH	
4 385.820	0.005	22 794.349	8			$5s5p\ ^1P_1$	$5s12s\ ^1S_0$	78RUB/BOR	
4 392.86	0.04	22 757.8				$5s5p\ ^1P_1$	$5s12s\ ^3S_1$	77ESH	
4 406.009	0.005	22 689.904	10		1.2(3)E+7	$5s4d\ ^1D_2$	$5s6f\ ^1F_3$	78RUB/BOR	88VAE/GOD
4 412.621	0.0015	22 655.905	4			$5s5p\ ^3P_1$	$5p^2\ ^1S_0$	38SUL	
4 418.087	0.005	22 627.876	3			$5s4d\ ^1D_2$	$5s6f\ ^3F_3$	78RUB/BOR	
4 425.77	0.04	22 588.6				$5s5p\ ^1P_1$	$5s10d\ ^3D_2$	77ESH	
4 434.70	0.04	22 543.1				$5s5p\ ^1P_1$	$5s10d\ ^1D_2$	77ESH	
4 438.044	0.0015	22 526.125	25		1.55(12)E+7	$5s5p\ ^3P_2$	$5s7s\ ^3S_1$	38SUL	88GAR/CAM
4 451.804	0.0015	22 456.500	2			$5s5p\ ^3P_1$	$5p^2\ ^1D_2$	38SUL	
4 463.301	0.005	22 398.656	9			$5s5p\ ^1P_1$	$5s11s\ ^1S_0$	78RUB/BOR	
4 474.04	0.04	22 344.9				$5s5p\ ^1P_1$	$5s11s\ ^3S_1$	77ESH	
4 480.507	0.0015	22 312.642	10	h	1.9(4)E+7	$5s4d\ ^1D_2$	$5s8p\ ^1P_1$	38SUL	92WER/GRE
4 522.301	0.005	22 106.438	3			$5s5p\ ^1P_1$	$5s9d\ ^3D_2$	78RUB/BOR	
4 531.348	0.0015	22 062.302	10			$5s5p\ ^3P_2$	$5p^2\ ^1D_2$	38SUL	
4 532.375	0.005	22 057.303	8			$5s5p\ ^1P_1$	$5s9d\ ^1D_2$	78RUB/BOR	
4 582.993	0.005	21 813.689	9			$5s5p\ ^1P_1$	$5s10s\ ^1S_0$	78RUB/BOR	
4 600.86	0.04	21 729.0				$5s5p\ ^1P_1$	$5s10s\ ^3S_1$	77ESH	
4 607.331	0.0015	21 698.462	600	r	2.01(3)E+8	$5s^2\ ^1S_0$	$5s5p\ ^1P_1$	38SUL	76PAR/REE
4 677.750	0.005	21 371.817	3			$5s5p\ ^1P_1$	$5s8d\ ^3D_2$	78RUB/BOR	
4 678.326	0.0015	21 369.186	20	h	1.9(5)E+7	$5s4d\ ^1D_2$	$5s5f\ ^1F_3$	38SUL	88VAE/GOD
4 688.546	0.005	21 322.606	10			$5s5p\ ^1P_1$	$5s8d\ ^1D_2$	78RUB/BOR	
4 703.984	0.0016	21 252.629	2			$5s4d\ ^3D_1$	$5s7p\ ^3P_0$	38SUL	
4 712.146	0.005	21 215.817	6			$5s4d\ ^1D_2$	$5s5f\ ^3F_3$	78RUB/BOR	
4 712.347	0.005	21 214.912	3			$5s4d\ ^1D_2$	$5s5f\ ^3F_2$	78RUB/BOR	
4 713.959	0.0016	21 207.658	3			$5s4d\ ^3D_2$	$5s7p\ ^3P_1$	38SUL	
4 722.278	0.0016	21 170.298	30		3.6(3)E+7	$5s5p\ ^3P_1$	$5p^2\ ^3P_2$	38SUL	88GAR/CAM

TABLE 4. Spectral lines of Sr I—Continued

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
4 729.466	0.0016	21 138.123	4	h		$5s4d\ ^3D_3$	$5s7p\ ^3P_2$	38SUL	
4 741.922	0.0016	21 082.599	30		3.9(3)E+7	$5s5p\ ^3P_0$	$5p^2\ ^3P_1$	38SUL	88GAR/CAM
4 755.495	0.0016	21 022.426	12	h	2.1(4)E+7	$5s4d\ ^1D_2$	$4d5p\ ^1P_1$	38SUL	92WER/GRE
4 783.782	0.005	20 898.120	10			$5s5p\ ^1P_1$	$5s9s\ ^1S_0$	78RUB/BOR	
4 784.320	0.0016	20 895.770	30		3.0(2)E+7	$5s5p\ ^3P_1$	$5p^2\ ^3P_1$	38SUL	88GAR/CAM
4 811.881	0.0016	20 776.087	40		9.0(6)E+7	$5s5p\ ^3P_2$	$5p^2\ ^3P_2$	38SUL	88GAR/CAM
4 832.043	0.005	20 689.399	0		3.3(2)E+7	$5s5p\ ^3P_0$	$5s5d\ ^3D_1$	78RUB/BOR	88GAR/CAM
4 855.045	0.0016	20 591.379	20		2.63(18)E+7	$5s4d\ ^3D_1$	$5s4f\ ^3F_2$	38SUL	88GAR/CAM
4 868.700	0.0016	20 533.628	20		3.4(2)E+7	$5s4d\ ^3D_2$	$5s4f\ ^3F_3$	38SUL	88GAR/CAM
4 869.170	0.005	20 531.646	6		7.5(5)E+6	$5s4d\ ^3D_2$	$5s4f\ ^3F_2$	78RUB/BOR	88GAR/CAM
4 872.493	0.0016	20 517.644	25		4.8(3)E+7	$5s5p\ ^3P_1$	$5s5d\ ^3D_2$	38SUL	88GAR/CAM
4 876.075	0.005	20 502.572	0		2.63(18)E+7	$5s5p\ ^3P_1$	$5s5d\ ^3D_1$	78RUB/BOR	88GAR/CAM
4 891.980	0.0016	20 435.914	25		3.8(4)E+7	$5s4d\ ^3D_3$	$5s4f\ ^3F_4$	38SUL	88GAR/CAM
4 892.639	0.005	20 433.162	6		4.3(3)E+6	$5s4d\ ^3D_3$	$5s4f\ ^3F_3$	78RUB/BOR	88GAR/CAM
4 956.277	0.005	20 170.806	7			$5s5p\ ^1P_1$	$5s7d\ ^3D_2$	78RUB/BOR	
4 962.263	0.0017	20 146.474	40		6.14(9)E+7	$5s5p\ ^3P_2$	$5s5d\ ^3D_3$	38SUL	88GAR/CAM
4 965.584	0.005	20 133.000	11			$5s5p\ ^1P_1$	$5s7d\ ^1D_2$	78RUB/BOR	
4 967.944	0.0017	20 123.436	20		1.28(9)E+7	$5s5p\ ^3P_2$	$5s5d\ ^3D_2$	38SUL	88GAR/CAM
4 971.668	0.0017	20 108.363	2		1.3(1)E+6	$5s5p\ ^3P_2$	$5s5d\ ^3D_1$	38SUL	88GAR/CAM
5 077.692	0.005	19 688.499	4			$5s4d\ ^3D_3$	$4d5p\ ^1F_3$	78RUB/BOR	
5 156.040	0.0017	19 389.328	8		2.7(9)E+7	$5s4d\ ^1D_2$	$5s4f\ ^1F_3$	38SUL	88VAE/GOD
5 165.486	0.005	19 353.872	10			$5s5p\ ^1P_1$	$5s8s\ ^1S_0$	78RUB/BOR	
5 212.978	0.0017	19 177.554	3		1.9(1)E+6	$5s4d\ ^3D_1$	$4d5p\ ^3P_2$	38SUL	88GAR/CAM
5 222.198	0.0017	19 143.695	20		3.4(2)E+7	$5s4d\ ^3D_1$	$4d5p\ ^3P_1$	38SUL	88GAR/CAM
5 225.108	0.0017	19 133.034	20			$5s4d\ ^3D_1$	$4d5p\ ^3P_0$	38SUL	
5 229.270	0.0017	19 117.806	20		2.27(16)E+7	$5s4d\ ^3D_2$	$4d5p\ ^3P_2$	38SUL	88GAR/CAM
5 238.549	0.0017	19 083.943	30		7.3(5)E+7	$5s4d\ ^3D_2$	$4d5p\ ^3P_1$	38SUL	88GAR/CAM
5 256.899	0.0018	19 017.328	50		8.1(6)E+7	$5s4d\ ^3D_3$	$4d5p\ ^3P_2$	38SUL	88GAR/CAM
5 329.813	0.0018	18 757.167	8		1.7(3)E+7	$5s4d\ ^1D_2$	$5s7p\ ^1P_1$	38SUL	92WER/GRE
5 374.069	0.005	18 602.701	0			$5s4d\ ^1D_2$	$5s4f\ ^3F_3$	78RUB/BOR	
5 450.836	0.0018	18 340.713	15		1.47(10)E+7	$5s4d\ ^3D_2$	$4d5p\ ^3D_3$	38SUL	88GAR/CAM
5 480.865	0.0018	18 240.227	40		7.9(5)E+7	$5s4d\ ^3D_3$	$4d5p\ ^3D_3$	38SUL	88GAR/CAM
5 486.136	0.0018	18 222.702	15		1.53(10)E+7	$5s4d\ ^3D_1$	$4d5p\ ^3D_2$	38SUL	88GAR/CAM
5 504.184	0.0018	18 162.951	30		5.4(4)E+7	$5s4d\ ^3D_2$	$4d5p\ ^3D_2$	38SUL	88GAR/CAM
5 521.765	0.0018	18 105.122	25		6.3(4)E+7	$5s4d\ ^3D_1$	$4d5p\ ^3D_1$	38SUL	88GAR/CAM
5 534.794	0.0018	18 062.503	15		2.27(16)E+7	$5s4d\ ^3D_3$	$4d5p\ ^3D_2$	38SUL	88GAR/CAM
5 540.051	0.0018	18 045.363	15		2.84(19)E+7	$5s4d\ ^3D_2$	$4d5p\ ^3D_1$	38SUL	88GAR/CAM
5 543.355	0.0018	18 034.608	15	h		$5s5p\ ^1P_1$	$5s6d\ ^1D_2$	38SUL	
5 556.384	0.005	17 992.320	9			$5s5p\ ^1P_1$	$5s6d\ ^3D_2$	78RUB/BOR	
5 557.908	0.005	17 987.386	3			$5s5p\ ^1P_1$	$5s6d\ ^3D_1$	78RUB/BOR	
5 598.163	0.005	17 858.045	8		3.0(8)E+5	$5s4d\ ^1D_2$	$4d5p\ ^1F_3$	78RUB/BOR	88VAE/GOD
5 816.771	0.0019	17 186.904	25		3.0(2)E+5	$5s4d\ ^1D_2$	$4d5p\ ^3P_2$	38SUL	88GAR/CAM
5 970.078	0.002	16 745.561	12	h		$5s5p\ ^1P_1$	$5s7s\ ^1S_0$	38SUL	
6 158.951	0.005	16 232.039	6			$5s4d\ ^1D_2$	$4d5p\ ^3D_2$	78RUB/BOR	
6 203.901	0.005	16 114.432	0			$5s4d\ ^1D_2$	$4d5p\ ^3D_1$	78RUB/BOR	
6 272.042	0.002	15 939.362	2		1.4(3)E+4	$5s4d\ ^3D_1$	$5s6p\ ^1P_1$	38SUL	92WER/GRE
6 345.726	0.002	15 754.282	40		2.1(4)E+6	$5s4d\ ^3D_2$	$5s6p\ ^3P_2$	38SUL	92WER/GRE
6 363.910	0.002	15 709.267	6		3.7(8)E+6	$5s4d\ ^3D_1$	$5s6p\ ^3P_1$	38SUL	92WER/GRE
6 369.918	0.002	15 694.450	15		1.8(4)E+7	$5s4d\ ^3D_1$	$5s6p\ ^3P_0$	38SUL	92WER/GRE
6 380.728	0.002	15 667.862	30		5.2(10)E+6	$5s4d\ ^3D_1$	$4d5p\ ^1D_2$	38SUL	92WER/GRE
6 386.458	0.002	15 653.804	40		1.1(2)E+7	$5s4d\ ^3D_3$	$5s6p\ ^3P_2$	38SUL	92WER/GRE
6 388.203	0.002	15 649.528	25		1.4(3)E+7	$5s4d\ ^3D_2$	$5s6p\ ^3P_1$	38SUL	92WER/GRE
6 408.463	0.002	15 600.054	100		2.4(5)E+7	$5s4d\ ^3D_3$	$4d5p\ ^3F_4$	38SUL	92WER/GRE
6 446.654	0.002	15 507.637	12		1.5(3)E+6	$5s4d\ ^3D_3$	$4d5p\ ^1D_2$	38SUL	92WER/GRE
6 465.774	0.002	15 461.780	10			$5s5p\ ^1P_1$	$5p^2\ ^1S_0$	38SUL	
6 503.989	0.002	15 370.933	80		2.0(4)E+7	$5s4d\ ^3D_2$	$4d5p\ ^3F_3$	38SUL	92WER/GRE
6 546.791	0.002	15 270.440	20		3.8(8)E+6	$5s4d\ ^3D_3$	$4d5p\ ^3F_3$	38SUL	92WER/GRE

TABLE 4. Spectral lines of Sr I—Continued

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
6 550.244	0.002	15 262.391	60		8.9(21)E+7	$5s5p\ ^1P_1$	$5p^2\ ^1D_2$	38SUL	88VAE/GOD
6 617.266	0.002	15 107.809	50		1.6(3)E+7	$5s4d\ ^3D_1$	$4d5p\ ^3F_2$	38SUL	92WER/GRE
6 643.536	0.002	15 048.070	20		4.4(8)E+6	$5s4d\ ^3D_2$	$4d5p\ ^3F_2$	38SUL	92WER/GRE
6 791.022	0.002	14 721.261	500		8.9(8)E+6	$5s5p\ ^3P_0$	$5s6s\ ^3S_1$	38SUL	88GAR/CAM
6 878.313	0.002	14 534.438	1000		2.7(2)E+7	$5s5p\ ^3P_1$	$5s6s\ ^3S_1$	38SUL	88GAR/CAM
6 892.585	0.002	14 504.343	200		4.69(11)E+4	$5s^2\ ^1S_0$	$5s5p\ ^3P_1$	38SUL	97DRO/IGN
7 070.071	0.002	14 140.231	2000		4.2(4)E+7	$5s5p\ ^3P_2$	$5s6s\ ^3S_1$	38SUL	88GAR/CAM
7 153.02	0.01	13 976.26	30			$5s5p\ ^1P_1$	$5p^2\ ^3P_2$	33MEG	
7 167.143	0.002	13 948.716	200	l	9.4(19)E+6	$5s4d\ ^1D_2$	$5s6p\ ^1P_1$	38SUL	92WER/GRE
7 232.131	0.002	13 823.374	100	l	6.0(12)E+6	$5s4d\ ^1D_2$	$5s6p\ ^3P_2$	38SUL	92WER/GRE
7 287.344	0.002	13 718.641	20	h	1.6(3)E+6	$5s4d\ ^1D_2$	$5s6p\ ^3P_1$	38SUL	92WER/GRE
7 309.417	0.002	13 677.213	500		3.9(8)E+7	$5s4d\ ^1D_2$	$4d5p\ ^1D_2$	38SUL	92WER/GRE
7 408.12	0.01	13 494.99	5			$5s5p\ ^1P_1$	$5p^2\ ^3P_0$	33MEG	
7 438.42	0.01	13 440.03	3		5.0(3)E+5	$5s4d\ ^1D_2$	$4d5p\ ^3F_3$	33MEG	88GAR/CAM
7 503.38	0.01	13 323.66	1			$5s5p\ ^1P_1$	$5s4d\ ^3D_2$	33MEG	
7 621.500	0.002	13 117.166	100		7.8(5)E+6	$5s4d\ ^1D_2$	$4d5p\ ^3F_2$	38SUL	88GAR/CAM
7 673.077	0.002	13 028.995	200	s	6.6(16)E+6	$5s5p\ ^1P_1$	$5s5d\ ^1D_2$	38SUL	88VAE/GOD
9 170.0	0.17	10 902.1	40			$4d5p\ ^1D_2$	$4d^2\ ^3P_2$	73NEW/OCO	
9 204.5	0.17	10 861.3	30			$5s6p\ ^3P_1$	$4d^2\ ^3P_2$	73NEW/OCO	
9 283.9	0.17	10 768.4	20			$4d5p\ ^1D_2$	$4d^2\ ^3P_1$	73NEW/OCO	
9 294.1	0.17	10 756.7	100			$5s6p\ ^3P_2$	$4d^2\ ^3P_2$	73NEW/OCO	
9 306.6	0.17	10 742.1	15			$5s6p\ ^3P_0$	$4d^2\ ^3P_1$	73NEW/OCO	
9 319.2	0.17	10 727.6	30			$5s6p\ ^3P_1$	$4d^2\ ^3P_1$	73NEW/OCO	
9 380.45	0.18	10 657.55	60			$5s6p\ ^3P_1$	$4d^2\ ^3P_0$	73NEW/OCO	
9 596.0	0.18	10 418.2	600			$5s6s\ ^3S_1$	$5s7p\ ^3P_2$	73NEW/OCO	
9 624.7	0.18	10 387.1	300			$5s6s\ ^3S_1$	$5s7p\ ^3P_1$	73NEW/OCO	
9 638.1	0.19	10 372.6	100			$5s6s\ ^3S_1$	$5s7p\ ^3P_0$	73NEW/OCO	
9 817.3	0.19	10 183.3	4			$4d5p\ ^1P_1$	$4d5d\ ^1D_2$	73NEW/OCO	
vacuum									
10 039.410	0.002	9 960.745	300	*		$5s5d\ ^3D_3$	$5s11f\ ^3F_3$	38SUL	
10 039.410	0.002	9 960.745	300	*		$5s5d\ ^3D_3$	$5s11f\ ^3F_4$	38SUL	
10 867.27	0.24	9 201.94	4			$5s6p\ ^3P_1$	$5s8d\ ^3D_2$	73NEW/OCO	
10 987.01	0.24	9 101.66	10			$5s6p\ ^3P_2$	$5s8d\ ^3D_3$	73NEW/OCO	
11 244.33	0.25	8 893.37	700			$5s5p\ ^1P_1$	$5s6s\ ^1S_0$	73NEW/OCO	
12 051.0	0.3	8 298.1	8			$5s6s\ ^3S_1$	$4d5p\ ^3P_2$	73NEW/OCO	
12 101.3	0.3	8 263.6	4	bl		$5s6s\ ^3S_1$	$4d5p\ ^3P_1$	73NEW/OCO	
12 174.96	0.3	8 213.58	15	s		$4d5p\ ^3D_2$	$4d^2\ ^3P_2$	73NEW/OCO	
12 239.57	0.3	8 170.22	20			$4d5p\ ^3D_3$	$4d^2\ ^3P_2$	73NEW/OCO	
12 425.8	0.3	8 047.8	10	*		$4d5p\ ^1D_2$	$5s7d\ ^3D_3$	73NEW/OCO	
12 425.8	0.3	8 047.8	10	*		$5s5d\ ^1D_2$	$5s6f\ ^3F_3$	73NEW/OCO	
12 483.0	0.3	8 010.9	20			$5s6p\ ^3P_0$	$5s7d\ ^3D_1$	73NEW/OCO	
12 498.4	0.3	8 001.0	40			$5s6p\ ^3P_1$	$5s7d\ ^3D_2$	73NEW/OCO	
12 505.8	0.3	7 996.3	12			$5s6p\ ^3P_1$	$5s7d\ ^3D_1$	73NEW/OCO	
12 558.4	0.3	7 962.8	5			$5s6p\ ^3P_1$	$5s7d\ ^1D_2$	73NEW/OCO	
12 655.7	0.3	7 901.6	15			$5s6p\ ^3P_2$	$5s7d\ ^3D_3$	73NEW/OCO	
12 665.0	0.3	7 895.8	3			$5s6p\ ^3P_2$	$5s7d\ ^3D_2$	73NEW/OCO	
12 932.1	0.3	7 732.7	10	*		$5s6p\ ^1P_1$	$5s7d\ ^1D_2$	73NEW/OCO	
12 932.1	0.3	7 732.7	10	*		$5s5d\ ^3D_3$	$5s6f\ ^3F_4$	73NEW/OCO	
13 464.8	0.4	7 426.8	6			$4d5p\ ^3P_1$	$4d^2\ ^3P_2$	73NEW/OCO	
13 526.5	0.4	7 392.9	15			$4d5p\ ^3P_2$	$4d^2\ ^3P_2$	73NEW/OCO	
14 504.8	0.4	6 894.26	3			$5s6p\ ^3P_1$	$5s8s\ ^3S_1$	73NEW/OCO	
14 724.0	0.4	6 791.62	6		6.1(15)E+5	$5s5d\ ^1D_2$	$5s5f\ ^1F_3$	73NEW/OCO	88VAE/GOD
14 729.1	0.4	6 789.28	4			$5s6p\ ^3P_2$	$5s8s\ ^3S_1$	73NEW/OCO	
15 516.5	0.5	6 444.77	7		8.0(20)E+5	$5s5d\ ^1D_2$	$4d5p\ ^1P_1$	73NEW/OCO	88VAE/GOD
15 730.7	0.5	6 357.0	5			$5s5d\ ^3D_1$	$5s5f\ ^3F_2$	73NEW/OCO	
15 765.4	0.5	6 343.0	8	*		$5s5d\ ^3D_2$	$5s5f\ ^3F_2$	73NEW/OCO	
15 765.4	0.5	6 343.0	8	*		$5s5d\ ^3D_2$	$5s5f\ ^3F_3$	73NEW/OCO	

TABLE 4. Spectral lines of Sr I—Continued

λ (Å)	Unc. (Å)	σ (cm^{-1})	Int.	Line Code	A_{ki} (s^{-1})	Lower Level	Upper Level	λ Ref.	A_{ki} Ref.
15 821.0	0.5	6 320.7	5	*		$5s5d\ ^3D_3$	$5s5f\ ^3F_3$	73NEW/OCO	
15 821.0	0.5	6 320.7	5	*		$5s5d\ ^3D_3$	$5s5f\ ^3F_4$	73NEW/OCO	
17 018.4	0.6	5 875.98	3			$4d5p\ ^1D_2$	$5s6d\ ^3D_3$	73NEW/OCO	
17 053.3	0.6	5 863.98	1			$4d5p\ ^1D_2$	$5s6d\ ^3D_2$	73NEW/OCO	
17 145.6	0.6	5 832.40	15			$5s6p\ ^3P_0$	$5s6d\ ^3D_1$	73NEW/OCO	
17 175.2	0.6	5 822.35	30			$5s6p\ ^3P_1$	$5s6d\ ^3D_2$	73NEW/OCO	
17 189.1	0.6	5 817.64	10			$5s6p\ ^3P_1$	$5s6d\ ^3D_1$	73NEW/OCO	
17 452.1	0.6	5 729.96	50			$5s6p\ ^3P_2$	$5s6d\ ^3D_3$	73NEW/OCO	
17 489.5	0.6	5 717.72	10			$5s6p\ ^3P_2$	$5s6d\ ^3D_2$	73NEW/OCO	
17 713.8	0.6	5 645.32	8			$5s5p\ ^3P_1$	$5s4d\ ^1D_2$	73NEW/OCO	
17 747.9	0.6	5 634.48	30			$5s6p\ ^1P_1$	$5s6d\ ^1D_2$	73NEW/OCO	
19 765.0	0.8	5 059.44	15			$5s6s\ ^3S_1$	$5s6p\ ^1P_1$	73NEW/OCO	
20 267.0	0.8	4 934.14	230			$5s6s\ ^3S_1$	$5s6p\ ^3P_2$	73NEW/OCO	
20 706.3	0.9	4 829.44	120			$5s6s\ ^3S_1$	$5s6p\ ^3P_1$	73NEW/OCO	
20 770.1	0.9	4 814.61	40			$5s6s\ ^3S_1$	$5s6p\ ^3P_0$	73NEW/OCO	
20 784.4	0.9	4 811.30	15		3.9(10)E+6	$5s5d\ ^1D_2$	$5s4f\ ^1F_3$	73NEW/OCO	88VAE/GOD
20 884.7	0.9	4 788.20	10			$5s6s\ ^3S_1$	$4d5p\ ^1D_2$	73NEW/OCO	
26 030.7	1.4	3 841.62	30			$5s5p\ ^3P_0$	$5s4d\ ^3D_1$	73NEW/OCO	

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