

Laffittite, AgHgAsS_3 : crystal structure and second occurrence from the Getchell mine, Nevada

IZUMI NAKAI¹ AND DANIEL E. APPLEMAN

Department of Mineral Sciences
Smithsonian Institution
Washington, D.C. 20560

Abstract

Laffittite was found in a museum specimen labelled getchellite, from the Getchell mine, Humboldt County, Nevada. The mineral occurs in grains about 1 mm in maximum length as dark red crystals associated with orpiment, getchellite and realgar.

Laffittite, AgHgAsS_3 , is monoclinic, space group Aa , $a = 7.732(3)$, $b = 11.285(7)$, $c = 6.643(4)\text{\AA}$, $\beta = 115.16(3)^\circ$, $Z = 4$. The strongest lines in the X-ray powder pattern are 3.512(100)(200), 3.202(78)(031, $\bar{1}$ 31), 3.015(69)(002), 2.685(67)($\bar{2}$ 31), 1.898(29)($\bar{1}$ 33, $\bar{2}$ 33), 2.136(18)(231, $\bar{3}$ 31), 3.633(16)(111), 1.889(14)($\bar{4}$ 11).

Single crystals were hydrothermally synthesized at 350°C under 10,000 psi pressure for 140 hours. The starting material was a fused mixture of Ag_2S , HgS and As_2S_3 having a molar ratio of 1:2:1.

The crystal structure of laffittite is a superstructure based upon the PbS structure. Metal-sulfur bonds form a hexagonal ring of one formula unit. The hexagonal rings link to each other by sharing all edges forming a sheet parallel to (100). The sheets link up and down by Hg-S and Ag-S bonds to form a three-dimensional network. As has the usual trigonal coordination by 3S (As-S = 2.26Å, avg.). Ag has (3 + 1)S coordination: Ag-S = 2.51, 2.52, 2.60 and 2.89Å. The Hg coordination group is a distorted tetrahedron: Hg-S = 2.42, 2.51, 2.71, and 2.73Å. The structure is closely related to that of marrite, PbAgAsS_3 .

Description and synthesis

Introduction

The rare mineral laffittite, AgHgAsS_3 , was first described by Johan *et al.* (1974¹) from the Jas Roux mine, Hautes Alpes, France. As far as we know, laffittite has not been reported from any other locality, and their work is the only report which has appeared on this mineral. They reported that laffittite occurred in grains up to 0.2 mm in dolomitic rock associated with routhierite, realgar, stibnite, pierrotite, smithite, sphalerite and pyrite.

During an investigation of a museum specimen from Nevada, the authors recognized a small dark red grain among getchellite crystals, and subsequent X-ray diffraction study and chemical analysis revealed it to be laffittite. We present here some mineralogical data, a method of synthesis, and new crystal data including a complete structure analysis.

Mineralogy

Laffittite was found in a Smithsonian Museum of Natural History specimen (#134796) labelled getchellite, from the Getchell mine, Humboldt County, Nevada. The specimen, about 12 × 9 × 6 cm, is a large mass of orpiment, in which getchellite veinlets are prominent. Laffittite occurs in anhedral grains about 1 mm in maximum length. The grains are usually surrounded by getchellite and/or orpiment. Other associated minerals include realgar, stibnite which is commonly observed as inclusions in orpiment, and rarely sphalerite. The typical mineral assemblage can be seen in Figure 1.

Laffittite is dark red in color and is darker than getchellite. The mineral has adamantine luster and the streak is brownish red. In reflected light in air, laffittite is clearly bireflectant, from light bluish gray with an olive tint resembling tetrahedrite, to dark bluish gray with an olive tint. Although the mineral is strongly anisotropic, this is obscured by its strong brilliant red internal reflection. These optical properties resemble those reported for laffittite in the

¹Present address: Department of Chemistry, The University of Tsukuba, Ibaraki 305, Japan.

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
0	0	2	1		492.16	588.21	0	10	4	1		27.18	27.77
0	0	4	1		290.67	300.77	0	10	6	1	L	17.31	16.07
0	0	6	1		157.86	163.29	0	10	8	1	L	12.22	8.76
0	0	8	1		92.94	98.11	0	11	1	1		95.28	111.00
0	0	10	1		44.79	42.48	0	11	3	1		63.07	56.08
0	1	1	1		33.07	41.51	0	11	5	1		28.54	22.40
0	1	3	1		57.85	57.82	0	11	7	1		26.85	26.48
0	1	5	1		46.67	41.16	0	12	0	1	L	18.70	15.74
0	1	7	1		41.67	40.01	0	12	2	1		26.71	38.30
0	1	9	1		39.44	40.84	0	12	4	1		28.93	41.17
0	2	0	1		59.82	64.17	0	12	6	1	L	13.90	32.05
0	2	2	1		97.72	96.95	0	12	8	1	L	9.04	33.25
0	2	4	1		108.30	98.48	0	13	1	1	L	0.0	13.72
0	2	6	1		65.92	64.82	0	13	3	1		28.72	27.07
0	2	8	1	L	25.88	26.38	0	13	5	1		25.43	23.59
0	2	10	1	L	14.81	12.92	0	13	7	1	L	8.74	13.46
0	3	1	1		455.86	404.40	0	14	0	1	L	2.01	16.25
0	3	3	1		418.24	374.34	0	14	2	1		25.93	33.77
0	3	5	1		272.51	258.17	0	14	4	1		43.83	38.11
0	3	7	1		135.01	132.32	0	14	6	1		26.80	24.15
0	3	9	1		58.69	60.18	0	15	1	1	L	13.79	17.34
0	4	0	1		32.10	37.06	0	15	3	1	L	20.19	28.21
0	4	2	1		58.35	51.35	0	15	5	1	L	17.83	32.64
0	4	4	1		76.58	72.77	0	16	0	1		22.90	24.43
0	4	6	1		73.45	70.76	0	16	2	1	L	12.55	15.48
0	4	8	1		44.64	43.02	0	16	4	1	L	0.0	2.20
0	4	10	1	L	8.10	13.83	0	16	6	1		26.54	10.84
0	5	1	1		115.40	113.68	0	17	1	1	L	7.97	24.19
0	5	3	1		58.37	55.40	0	17	3	1	L	22.26	16.04
0	5	5	1		80.14	74.26	0	17	5	1	L	11.30	3.18
0	5	7	1		82.32	78.46	0	18	0	1	L	20.38	19.93
0	5	9	1		48.77	48.86	0	18	2	1	L	20.45	20.34
0	6	0	1		284.02	336.94	0	18	4	1	L	17.70	22.32
0	6	2	1		313.32	277.92	0	19	1	1	L	0.0	14.13
0	6	4	1		192.58	174.31	1	1	1	1		143.40	149.63
0	6	6	1		109.43	106.80	1	1	3	1		65.57	72.88
0	6	8	1		65.30	68.93	1	1	5	1		30.88	33.49
0	7	1	1		22.18	21.63	1	1	7	1		51.00	46.21
0	7	3	1		36.56	26.30	1	1	9	1	L	25.98	30.16
0	7	5	1		30.18	23.14	1	2	0	1		134.57	128.22
0	7	7	1	L	18.17	19.91	1	2	2	1		93.18	101.19
0	7	9	1	L	8.35	17.50	1	2	4	1		88.75	93.10
0	8	0	1		36.38	50.95	1	2	6	1		52.03	50.49
0	8	2	1		97.60	102.83	1	2	8	1	L	0.0	10.00
0	8	4	1		118.76	106.90	1	2	10	1	L	0.0	10.08
0	8	6	1		62.07	54.61	1	3	1	1		130.86	122.73
0	8	8	1	L	18.50	19.05	1	3	3	1		84.21	84.57
0	9	1	1		127.74	147.39	1	3	5	1		71.42	67.46
0	9	3	1		126.93	116.85	1	3	7	1		40.59	36.08
0	9	5	1		94.69	85.66	1	3	9	1	L	17.75	11.68
0	9	7	1		55.15	53.28	1	4	0	1		114.51	131.23
0	9	9	1	L	19.13	21.34	1	4	2	1		128.68	130.87
0	10	0	1		32.80	46.84	1	4	4	1		110.20	105.18
0	10	2	1		36.46	40.95	1	4	6	1		62.33	65.60

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
1	4	8	1	L	24.97	30.03	1	18	0	1		39.80	51.84
1	5	1	1		119.51	115.17	1	18	2	1		47.34	45.20
1	5	3	1		74.24	68.00	1	19	1	1	L	19.13	18.64
1	5	5	1	L	21.56	18.38	-1	1	1	1		135.09	143.01
1	5	7	1	L	0.0	7.96	-1	1	3	1		115.16	122.58
1	5	9	1	L	18.39	7.40	-1	1	5	1		109.49	114.63
1	6	0	1		248.02	296.82	-1	1	7	1		67.32	75.31
1	6	2	1		293.63	265.76	-1	1	9	1	L	16.26	27.12
1	6	4	1		174.78	160.98	-1	2	2	1		160.59	163.07
1	6	6	1		83.08	82.16	-1	2	4	1		91.44	93.43
1	6	8	1		50.66	52.13	-1	2	6	1	L	14.06	14.47
1	7	1	1		79.17	87.59	-1	2	8	1		23.73	27.93
1	7	3	1		99.94	91.02	-1	2	10	1	L	21.80	21.35
1	7	5	1		67.99	69.34	-1	3	1	1		179.08	200.21
1	7	7	1		34.65	33.81	-1	3	3	1		193.61	187.58
1	7	9	1	L	17.13	14.80	-1	3	5	1		116.89	117.62
1	8	0	1		44.69	52.28	-1	3	7	1		55.64	53.12
1	8	2	1		48.27	41.04	-1	3	9	1		35.66	34.10
1	8	4	1		40.90	30.54	-1	4	2	1		126.28	110.36
1	8	6	1		31.35	25.71	-1	4	4	1		76.34	75.18
1	8	8	1	L	17.85	19.27	-1	4	6	1		46.55	45.46
1	9	1	1		168.96	188.54	-1	4	8	1		38.13	32.07
1	9	3	1		168.63	153.76	-1	4	10	1	L	21.49	21.42
1	9	5	1		134.09	121.31	-1	5	1	1		87.58	95.90
1	9	7	1		71.36	71.28	-1	5	3	1		48.71	48.54
1	10	0	1		52.04	61.51	-1	5	5	1		39.21	38.09
1	10	2	1		53.14	50.71	-1	5	7	1	L	21.17	19.18
1	10	4	1		33.96	31.03	-1	5	9	1	L	17.57	0.50
1	10	6	1		50.57	39.70	-1	6	2	1		237.69	212.40
1	10	8	1		38.43	33.98	-1	6	4	1		145.71	134.68
1	11	1	1	L	9.12	20.58	-1	6	6	1		110.95	104.39
1	11	3	1	L	0.0	8.37	-1	6	8	1		65.52	64.49
1	11	5	1	L	19.83	15.49	-1	6	10	1	L	23.37	25.14
1	11	7	1		32.74	25.72	-1	7	1	1		81.23	92.15
1	12	0	1		130.15	175.75	-1	7	3	1		92.24	82.87
1	12	2	1		146.94	154.08	-1	7	5	1		56.73	50.03
1	12	4	1		112.98	103.96	-1	7	7	1		44.66	37.92
1	12	6	1		65.52	61.47	-1	7	9	1		35.46	32.13
1	13	1	1		40.56	54.25	-1	8	2	1		48.38	47.24
1	13	3	1		61.10	57.78	-1	8	4	1		36.11	28.32
1	13	5	1		52.29	44.77	-1	8	6	1	L	14.03	13.49
1	13	7	1	L	13.21	22.28	-1	8	8	1	L	12.53	9.23
1	14	0	1	L	13.48	10.54	-1	9	1	1		195.41	237.95
1	14	2	1	L	0.0	22.92	-1	9	3	1		258.00	230.04
1	14	4	1		43.09	38.01	-1	9	5	1		178.27	157.96
1	14	6	1		36.21	29.62	-1	9	7	1		95.02	86.28
1	15	1	1		82.47	101.74	-1	9	9	1		52.89	50.86
1	15	3	1		89.96	86.98	-1	10	2	1		50.13	57.40
1	15	5	1		72.24	65.82	-1	10	4	1		82.34	72.60
1	16	0	1	L	22.97	20.63	-1	10	6	1		73.48	65.80
1	16	2	1	L	19.97	16.66	-1	10	8	1		32.16	35.15
1	16	4	1	L	15.33	19.09	-1	11	1	1	L	14.85	16.65
1	17	1	1	L	28.88	40.78	-1	11	3	1	L	13.46	9.69
1	17	3	1		32.89	28.65	-1	11	5	1		32.33	26.73

H	K	L	G	C	F OBS	F CALC
-1	11	7	1		28.82	29.80
-1	12	2	1		148.76	158.75
-1	12	4	1		140.19	128.89
-1	12	6	1		111.15	98.18
-1	12	8	1		67.79	64.30
-1	13	1	1		43.65	48.72
-1	13	3	1		58.36	34.95
-1	13	5	1	L	6.78	10.22
-1	13	7	1	L	22.78	17.51
-1	14	2	1		36.42	35.56
-1	14	4	1		36.30	33.04
-1	14	6	1	L	20.02	13.96
-1	15	1	1		85.70	101.44
-1	15	3	1		92.47	89.03
-1	15	5	1		79.66	70.46
-1	15	7	1		55.20	47.54
-1	16	2	1		23.83	28.16
-1	16	4	1		32.44	30.53
-1	16	6	1		30.55	23.69
-1	17	1	1		31.74	31.13
-1	17	3	1	L	9.46	5.97
-1	17	5	1	L	12.26	14.23
-1	18	2	1		56.20	54.58
-1	18	4	1		52.99	45.41
-1	19	1	1	L	15.39	14.40
2	0	0	1		514.86	471.73
2	0	2	1		401.61	436.69
2	0	4	1		256.50	274.95
2	0	6	1		121.50	127.87
2	0	8	1		58.90	62.58
2	1	1	1		97.33	100.91
2	1	3	1		94.25	99.16
2	1	5	1		72.46	74.22
2	1	7	1		36.42	35.88
2	1	9	1	L	6.31	13.98
2	2	0	1		67.18	73.40
2	2	2	1		102.88	106.65
2	2	4	1		110.53	114.73
2	2	6	1		90.83	92.99
2	2	8	1		55.72	56.63
2	3	1	1		419.59	399.56
2	3	3	1		226.43	224.26
2	3	5	1		141.21	146.04
2	3	7	1		89.08	89.15
2	3	9	1		38.69	37.49
2	4	0	1		33.41	35.82
2	4	2	1		43.81	42.45
2	4	4	1	L	23.86	21.43
2	4	6	1	L	29.28	29.91
2	4	8	1	L	29.75	32.63
2	5	1	1		167.44	159.03
2	5	3	1		125.74	121.35
2	5	5	1		56.61	49.49
2	5	7	1	L	30.60	26.88

H	K	L	G	C	F OBS	F CALC
2	5	9	1	L	24.59	28.63
2	6	0	1		262.76	275.93
2	6	2	1		259.04	240.77
2	6	4	1		165.62	157.03
2	6	6	1		84.05	76.41
2	6	8	1		36.66	32.85
2	7	1	1		49.57	51.50
2	7	3	1		52.96	54.78
2	7	5	1		51.38	46.06
2	7	7	1		33.02	26.40
2	8	0	1		94.06	104.91
2	8	2	1		47.22	48.42
2	8	4	1		81.51	74.92
2	8	6	1		70.47	65.68
2	8	8	1	L	28.98	30.10
2	9	1	1		97.24	100.99
2	9	3	1		86.10	84.18
2	9	5	1		56.28	63.79
2	9	7	1		40.45	48.56
2	10	0	1	L	17.18	20.18
2	10	2	1	L	23.47	20.82
2	10	4	1	L	14.60	15.45
2	10	6	1	L	15.81	10.48
2	10	8	1	L	16.37	9.00
2	11	1	1		72.23	86.23
2	11	3	1		82.08	73.97
2	11	5	1		45.77	33.19
2	11	7	1	L	16.32	18.54
2	12	0	1		43.28	44.61
2	12	2	1		30.04	26.10
2	12	4	1	L	23.68	26.58
2	12	6	1	L	9.66	19.30
2	13	1	1	L	0.0	10.31
2	13	3	1	L	12.68	8.28
2	13	5	1	L	15.42	13.46
2	14	0	1		45.60	57.21
2	14	2	1		32.44	27.15
2	14	4	1	L	7.97	8.11
2	14	6	1	L	10.24	9.51
2	15	1	1	L	14.92	16.36
2	15	3	1	L	0.0	17.92
2	15	5	1	L	16.83	22.78
2	16	0	1	L	0.0	25.24
2	16	2	1	L	23.55	29.09
2	16	4	1	L	12.91	19.99
2	17	1	1	L	6.45	13.61
2	17	3	1	L	17.84	10.33
2	18	0	1	L	21.53	31.21
2	18	2	1		29.04	27.01
2	19	1	1	L	8.30	8.33
-2	0	2	1		352.52	386.01
-2	0	4	1		325.64	351.72
-2	0	6	1		257.10	264.41
-2	0	8	1		143.51	147.79

H	K	L	G	C	F CBS	F CALC
-2	0	10	1		65.86	69.72
-2	1	1	1		100.77	32.12
-2	1	3	1		23.90	24.12
-2	1	5	1		30.05	34.13
-2	1	7	1		56.54	56.48
-2	1	9	1		32.15	40.86
-2	1	11	1	L	17.72	14.46
-2	2	2	1		64.79	66.93
-2	2	4	1		56.33	54.57
-2	2	6	1		40.03	39.41
-2	2	8	1		42.42	42.73
-2	2	10	1		36.30	38.73
-2	3	1	1		517.56	550.15
-2	3	3	1		436.42	458.92
-2	3	5	1		270.96	269.33
-2	3	7	1		142.67	141.74
-2	3	9	1		79.37	81.04
-2	4	2	1		25.09	24.84
-2	4	4	1		53.78	50.58
-2	4	6	1		39.73	39.75
-2	4	8	1	L	19.37	18.06
-2	4	10	1	L	18.93	19.75
-2	5	1	1		120.46	107.15
-2	5	3	1		76.58	73.72
-2	5	5	1		93.39	92.06
-2	5	7	1		59.77	62.66
-2	5	9	1	L	22.64	21.63
-2	6	2	1		267.22	253.46
-2	6	4	1		224.22	212.58
-2	6	6	1		166.22	158.31
-2	6	8	1		95.51	96.05
-2	6	10	1		47.36	46.67
-2	7	1	1		34.66	49.16
-2	7	3	1		57.92	51.46
-2	7	5	1		52.75	52.94
-2	7	7	1		46.05	46.90
-2	7	9	1		31.19	31.52
-2	8	2	1		124.96	134.27
-2	8	4	1		88.64	80.79
-2	8	6	1		29.05	29.85
-2	8	8	1		43.73	39.92
-2	8	10	1		31.87	27.33
-2	9	1	1		97.30	110.89
-2	9	3	1		129.97	118.31
-2	9	5	1		106.29	99.53
-2	9	7	1		61.51	62.03
-2	9	9	1	L	26.31	40.90
-2	10	2	1	L	17.21	13.74
-2	10	4	1		22.69	15.15
-2	10	6	1		33.87	19.17
-2	10	8	1	L	20.94	15.25
-2	11	1	1		46.33	44.78
-2	11	3	1		37.64	40.49
-2	11	5	1		70.02	60.67

H	K	L	G	C	F OBS	F CALC
-2	11	7	1		51.28	41.45
-2	11	9	1	L	17.78	19.82
-2	12	2	1		45.09	46.03
-2	12	4	1		29.55	32.35
-2	12	6	1	L	17.51	41.79
-2	12	8	1		25.51	37.66
-2	13	1	1		23.96	27.89
-2	13	3	1		31.36	28.88
-2	13	5	1	L	14.46	14.76
-2	13	7	1	L	11.27	1.37
-2	14	2	1		59.49	66.04
-2	14	4	1		51.89	45.94
-2	14	6	1	L	20.99	17.72
-2	15	1	1	L	10.31	22.01
-2	15	3	1		22.71	20.77
-2	15	5	1	L	13.44	25.62
-2	15	7	1		23.41	22.55
-2	16	2	1	L	11.87	13.84
-2	16	4	1	L	20.97	19.56
-2	16	6	1	L	23.16	20.82
-2	17	1	1	L	8.08	13.78
-2	17	3	1	L	0.0	10.67
-2	17	5	1	L	0.0	11.92
-2	18	2	1		20.10	35.73
-2	18	4	1		27.92	30.22
-2	19	1	1	L	14.11	15.94
3	1	1	1		136.88	139.66
3	1	3	1		102.23	113.88
3	1	5	1		48.52	56.73
3	1	7	1	L	0.0	10.70
3	1	9	1	L	0.0	5.00
3	2	0	1		139.00	130.42
3	2	2	1		58.41	56.82
3	2	4	1	L	0.0	17.38
3	2	6	1	L	25.71	29.48
3	2	8	1	L	20.87	13.29
3	3	1	1		168.33	162.53
3	3	3	1		86.78	89.42
3	3	5	1		47.09	47.16
3	3	7	1		37.74	31.84
3	4	0	1		96.20	97.66
3	4	2	1		70.82	77.11
3	4	4	1		53.96	62.09
3	4	6	1		56.27	47.61
3	4	8	1	L	24.02	28.50
3	5	1	1		46.56	42.29
3	5	3	1		32.62	28.37
3	5	5	1	L	0.0	15.86
3	5	7	1	L	0.0	14.33
3	6	0	1		140.78	143.26
3	6	2	1		136.30	134.46
3	6	4	1		107.40	103.91
3	6	6	1		51.01	51.95
3	6	8	1	L	24.93	20.83

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
3	7	1	1		90.68	91.66	-3	3	5	1		73.52	76.03
3	7	3	1		70.83	71.53	-3	3	7	1		53.79	51.57
3	7	5	1		61.17	57.03	-3	3	9	1		41.47	34.59
3	7	7	1		45.57	35.84	-3	3	11	1	L	4.37	13.11
3	8	0	1		41.49	43.80	-3	4	2	1		109.58	102.75
3	8	2	1		46.61	42.53	-3	4	4	1		92.84	90.00
3	8	4	1		43.61	35.79	-3	4	6	1		77.28	73.59
3	8	6	1	L	27.13	30.07	-3	4	8	1		54.15	51.15
3	8	8	1	L	22.73	24.55	-3	4	10	1	L	19.09	27.17
3	9	1	1		194.50	197.05	-3	5	1	1		79.25	82.54
3	9	3	1		119.30	113.18	-3	5	3	1		101.43	103.20
3	9	5	1		67.69	68.63	-3	5	5	1		73.60	68.20
3	9	7	1		43.49	46.91	-3	5	7	1	L	15.49	19.22
3	10	0	1		60.17	78.32	-3	5	9	1	L	14.50	12.57
3	10	2	1		81.60	84.23	-3	6	2	1		207.79	200.95
3	10	4	1		64.89	60.91	-3	6	4	1		237.81	216.01
3	10	6	1		31.54	27.12	-3	6	6	1		167.70	158.29
3	11	1	1		53.30	58.41	-3	6	8	1		87.31	85.51
3	11	3	1		55.86	53.50	-3	6	10	1		50.33	47.85
3	11	5	1		37.90	32.88	-3	7	1	1		101.35	95.94
3	11	7	1	L	22.55	14.36	-3	7	3	1		73.17	65.67
3	12	0	1		110.61	138.47	-3	7	5	1		59.40	55.22
3	12	2	1		120.35	122.76	-3	7	7	1		58.72	55.46
3	12	4	1		93.71	91.95	-3	7	9	1		29.03	33.52
3	12	6	1		50.80	54.00	-3	8	2	1		33.71	32.79
3	13	1	1		32.53	33.62	-3	8	4	1	L	9.85	13.61
3	13	3	1	L	29.09	30.97	-3	8	6	1	L	7.75	6.13
3	13	5	1	L	29.57	32.25	-3	8	8	1	L	0.0	7.83
3	14	0	1		31.26	43.71	-3	8	10	1	L	24.23	15.58
3	14	2	1	L	0.0	21.40	-3	9	1	1		211.65	235.00
3	14	4	1	L	25.86	22.74	-3	9	3	1		211.10	196.14
3	15	1	1		66.93	73.35	-3	9	5	1		154.12	136.57
3	15	3	1		50.97	53.08	-3	9	7	1		111.31	101.69
3	15	5	1		37.54	36.45	-3	9	9	1		67.50	67.00
3	16	0	1		30.53	33.18	-3	10	2	1		70.38	73.11
3	16	2	1	L	22.93	26.80	-3	10	4	1		78.45	65.20
3	16	4	1	L	18.93	18.99	-3	10	6	1		29.59	30.30
3	17	1	1	L	16.11	24.51	-3	10	8	1	L	21.51	6.95
3	17	3	1		31.23	29.31	-3	11	1	1		41.53	40.08
3	18	0	1		38.73	48.28	-3	11	3	1	L	21.96	17.13
3	18	2	1		37.80	41.12	-3	11	5	1	L	15.84	19.54
-3	1	1	1		153.25	128.59	-3	11	7	1	L	2.06	13.15
-3	1	3	1		119.41	128.26	-3	11	9	1	L	7.06	2.32
-3	1	5	1		81.16	86.31	-3	12	2	1		133.11	146.73
-3	1	7	1	L	4.15	23.03	-3	12	4	1		155.67	138.41
-3	1	9	1	L	10.85	21.96	-3	12	6	1		122.41	105.99
-3	1	11	1	L	19.86	23.37	-3	12	8	1		75.92	67.54
-3	2	2	1		120.55	119.38	-3	13	1	1		32.59	34.29
-3	2	4	1		63.00	69.23	-3	13	3	1		28.79	28.50
-3	2	6	1		69.64	75.29	-3	13	5	1		49.08	40.78
-3	2	8	1		53.76	57.34	-3	13	7	1		49.00	42.77
-3	2	10	1	L	13.45	20.20	-3	14	2	1		43.32	47.13
-3	3	1	1		225.99	198.83	-3	14	4	1		24.81	23.69
-3	3	3	1		140.42	144.71	-3	14	6	1	L	13.57	6.38

H	K	L	G	C	F OBS	F CALC
-3	14	8	1	L	14.00	17.87
-3	15	1	1	L	0.0	91.58
-3	15	3	1		93.00	97.41
-3	15	5	1		96.51	83.69
-3	15	7	1		67.62	60.12
-3	16	2	1		29.10	34.06
-3	16	4	1		27.74	24.89
-3	16	6	1	L	15.62	10.35
-3	17	1	1	L	10.97	4.74
-3	17	3	1	L	18.14	22.23
-3	17	5	1		33.74	28.31
-3	18	2	1		49.20	45.63
-3	18	4	1		46.58	41.44
-3	19	1	1	L	5.58	8.65
4	0	0	1		169.31	326.59
4	0	2	1		199.94	202.40
4	0	4	1		134.90	147.12
4	0	6	1		71.03	81.80
4	0	8	1	L	7.71	26.70
4	1	1	1		112.34	115.58
4	1	3	1		92.85	95.22
4	1	5	1		67.81	71.38
4	1	7	1		40.67	46.61
4	2	0	1		151.89	145.74
4	2	2	1		98.07	99.37
4	2	4	1		52.08	54.43
4	2	6	1		37.48	39.05
4	2	8	1	L	32.53	30.92
4	3	1	1		319.05	308.98
4	3	3	1		178.38	184.42
4	3	5	1		80.09	83.10
4	3	7	1		47.99	47.74
4	4	0	1		75.12	77.60
4	4	2	1		82.44	83.87
4	4	4	1		68.77	67.73
4	4	6	1		35.60	35.35
4	4	8	1	L	22.22	14.42
4	5	1	1		109.13	117.30
4	5	3	1		128.49	130.53
4	5	5	1		88.41	91.87
4	5	7	1		40.96	41.47
4	6	0	1		179.23	173.67
4	6	2	1		126.51	130.82
4	6	4	1		93.24	100.15
4	6	6	1		58.67	61.65
4	6	8	1	L	28.80	28.31
4	7	1	1	L	19.83	14.71
4	7	3	1	L	0.0	8.70
4	7	5	1	L	19.21	16.75
4	7	7	1	L	27.57	18.16
4	8	0	1		123.54	132.44
4	8	2	1		92.11	87.16
4	8	4	1		31.65	30.60
4	8	6	1	L	26.20	32.66

H	K	L	G	C	F OBS	F CALC
4	9	1	1		98.82	90.36
4	9	3	1		56.61	52.61
4	9	5	1	L	28.20	24.94
4	9	7	1	L	0.0	15.13
4	10	0	1		23.26	16.06
4	10	2	1	L	19.79	12.96
4	10	4	1	L	5.45	9.41
4	10	6	1	L	12.35	6.37
4	11	1	1		26.80	30.30
4	11	3	1		38.21	40.61
4	11	5	1		38.01	28.39
4	12	0	1	L	21.98	21.51
4	12	2	1	L	25.94	28.86
4	12	4	1	L	12.59	27.19
4	12	6	1	L	22.63	25.16
4	13	1	1	L	16.04	23.91
4	13	3	1	L	25.99	12.02
4	13	5	1	L	25.28	9.32
4	14	0	1		35.48	42.48
4	14	2	1	L	29.28	31.47
4	14	4	1	L	15.37	12.84
4	15	1	1	L	15.46	13.02
4	15	3	1	L	15.90	15.41
4	16	0	1	L	10.08	9.76
4	16	2	1	L	24.70	20.11
4	17	1	1	L	9.86	10.68
4	18	0	1	L	20.98	23.39
-4	0	2	1		511.23	467.53
-4	0	4	1		418.10	432.70
-4	0	6	1		261.12	277.90
-4	0	8	1		144.61	146.31
-4	0	10	1		77.46	79.10
-4	1	1	1		125.07	96.00
-4	1	3	1		40.00	35.64
-4	1	5	1		48.25	49.31
-4	1	7	1		44.38	47.24
-4	1	9	1	L	8.76	14.93
-4	1	11	1	L	0.0	10.40
-4	2	2	1		162.72	141.15
-4	2	4	1		83.56	82.74
-4	2	6	1		37.49	40.38
-4	2	8	1		36.07	38.60
-4	2	10	1	L	23.44	27.77
-4	3	1	1		388.80	348.59
-4	3	3	1		287.31	283.00
-4	3	5	1		225.25	227.83
-4	3	7	1		179.96	180.14
-4	3	9	1		113.80	112.14
-4	3	11	1		55.87	57.70
-4	4	2	1		82.82	74.39
-4	4	4	1		60.62	58.99
-4	4	6	1		43.21	37.40
-4	4	8	1		39.72	43.63
-4	4	10	1		29.56	38.57

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
-4	5	1	1		93.67	80.94	-4	17	1	1	L	7.24	18.82
-4	5	3	1		95.53	94.84	-4	17	3	1	L	24.49	23.36
-4	5	5	1		74.50	75.65	-4	17	5	1		30.14	21.69
-4	5	7	1		31.30	32.75	-4	18	2	1	L	7.34	26.69
-4	5	9	1		34.05	30.72	-4	18	4	1	L	16.72	25.76
-4	5	11	1	L	17.02	27.79	5	1	1	1		37.62	39.29
-4	6	2	1		243.98	223.45	5	1	3	1		47.76	51.88
-4	6	4	1		236.62	220.38	5	1	5	1		46.72	46.47
-4	6	6	1		176.81	163.03	5	1	7	1	L	24.49	22.47
-4	6	8	1		95.57	96.98	5	2	0	1		70.85	71.25
-4	6	10	1		50.54	51.74	5	2	2	1		61.67	60.68
-4	7	1	1	L	11.49	9.59	5	2	4	1	L	19.34	24.50
-4	7	3	1		18.39	20.57	5	2	6	1	L	0.0	9.36
-4	7	5	1		41.12	40.23	5	3	1	1		70.87	70.43
-4	7	7	1		41.66	40.58	5	3	3	1		47.47	50.43
-4	7	9	1		34.02	28.24	5	3	5	1	L	28.99	21.30
-4	8	2	1		112.89	104.27	5	3	7	1	L	18.33	12.22
-4	8	4	1		50.37	48.62	5	4	0	1		113.65	115.70
-4	8	6	1		58.00	59.12	5	4	2	1		86.12	87.64
-4	8	8	1		47.63	47.51	5	4	4	1		47.13	48.08
-4	8	10	1	L	17.31	19.67	5	4	6	1	L	20.97	19.18
-4	9	1	1		122.33	125.78	5	5	1	1		55.14	52.24
-4	9	3	1		133.78	126.64	5	5	3	1	L	21.82	21.36
-4	9	5	1		103.57	92.32	5	5	5	1	L	10.87	12.06
-4	9	7	1		60.28	66.30	5	5	7	1	L	22.56	14.33
-4	9	9	1		44.81	53.62	5	6	0	1		166.84	164.74
-4	10	2	1	L	19.54	23.13	5	6	2	1		92.40	92.09
-4	10	4	1		36.70	31.08	5	6	4	1		54.20	58.04
-4	10	6	1		41.24	30.61	5	6	6	1	L	35.40	39.89
-4	10	8	1	L	20.00	21.83	5	7	1	1		80.67	87.16
-4	11	1	1		55.24	65.01	5	7	3	1		56.55	62.29
-4	11	3	1		94.37	94.77	5	7	5	1		39.50	34.43
-4	11	5	1		82.97	74.32	5	7	7	1	L	29.70	19.89
-4	11	7	1		40.26	23.58	5	8	0	1		59.52	57.81
-4	11	9	1	L	17.86	15.24	5	8	2	1		42.36	38.81
-4	12	2	1	L	11.58	14.74	5	8	4	1	L	24.52	23.42
-4	12	4	1		37.38	49.96	5	8	6	1	L	14.51	12.48
-4	12	6	1		40.04	55.38	5	9	1	1		118.49	124.89
-4	12	8	1	L	23.71	34.48	5	9	3	1		86.21	89.33
-4	13	1	1		28.36	29.74	5	9	5	1		40.35	44.04
-4	13	3	1	L	18.50	19.48	5	10	0	1		46.75	57.06
-4	13	5	1	L	5.37	4.45	5	10	2	1		47.61	50.47
-4	13	7	1	L	15.74	9.71	5	10	4	1		49.68	47.37
-4	14	2	1		35.51	31.60	5	10	6	1	L	33.66	31.74
-4	14	4	1	L	20.02	17.30	5	11	1	1		29.25	34.87
-4	14	6	1	L	19.77	23.08	5	11	3	1		40.79	43.86
-4	14	8	1	L	7.21	22.46	5	11	5	1		40.29	38.40
-4	15	1	1	L	0.0	13.34	5	12	0	1		91.81	96.49
-4	15	3	1	L	21.54	16.73	5	12	2	1		59.46	63.10
-4	15	5	1	L	23.52	28.71	5	12	4	1		36.83	46.03
-4	15	7	1	L	20.62	39.07	5	13	1	1		49.91	50.73
-4	16	2	1	L	0.0	11.24	5	13	3	1		35.48	37.22
-4	16	4	1	L	8.96	17.31	5	14	0	1		40.40	50.69
-4	16	6	1	L	0.0	10.76	5	14	2	1		37.79	42.44

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
5	14	4	1	L	26.88	22.37	-5	10	2	1		67.58	63.27
5	15	1	1		65.89	68.04	-5	10	4	1		41.88	39.57
5	15	3	1		47.84	47.37	-5	10	6	1		33.23	28.23
5	16	0	1	L	23.34	29.54	-5	10	8	1		47.32	42.78
5	16	2	1	L	23.11	26.68	-5	11	1	1		26.61	28.85
5	17	1	1	L	11.08	17.38	-5	11	3	1		34.38	37.48
-5	1	1	1		82.30	77.38	-5	11	5	1	L	23.56	31.13
-5	1	3	1		86.73	88.26	-5	11	7	1	L	17.18	11.54
-5	1	5	1		53.12	60.63	-5	11	9	1	L	23.13	12.31
-5	1	7	1		55.22	62.35	-5	12	2	1		118.54	124.90
-5	1	9	1		48.38	56.14	-5	12	4	1		131.15	124.37
-5	1	11	1	L	15.39	28.32	-5	12	6	1		115.17	103.18
-5	2	2	1		65.94	66.17	-5	12	8	1		84.69	75.94
-5	2	4	1		82.24	92.63	-5	13	1	1		50.48	51.02
-5	2	6	1		65.33	77.78	-5	13	3	1		49.79	51.26
-5	2	8	1	L	20.30	26.97	-5	13	5	1		55.65	48.90
-5	2	10	1	L	15.45	11.54	-5	13	7	1		29.88	29.92
-5	3	1	1		73.07	65.89	-5	14	2	1		38.48	34.26
-5	3	3	1		83.65	83.02	-5	14	4	1	L	8.93	14.90
-5	3	5	1		99.50	103.28	-5	14	6	1	L	22.33	23.88
-5	3	7	1		84.37	84.68	-5	14	8	1	L	19.56	19.66
-5	3	9	1		45.79	47.92	-5	15	1	1		75.43	81.41
-5	3	11	1	L	24.61	25.36	-5	15	3	1		79.40	79.18
-5	4	2	1		130.02	112.78	-5	15	5	1		71.67	65.99
-5	4	4	1		85.83	86.57	-5	15	7	1		60.02	54.97
-5	4	6	1		46.48	55.36	-5	16	2	1	L	0.0	23.36
-5	4	8	1		27.61	28.95	-5	16	4	1	L	9.30	14.12
-5	4	10	1	L	16.55	15.13	-5	16	6	1	L	16.87	18.14
-5	5	1	1		87.51	80.09	-5	17	1	1	L	1.11	31.55
-5	5	3	1		65.99	66.16	-5	17	3	1		38.16	38.42
-5	5	5	1		24.30	29.74	-5	17	5	1		35.35	27.07
-5	5	7	1		33.96	32.75	-5	18	2	1	L	4.72	37.03
-5	5	9	1		26.43	24.78	6	0	0	1		265.28	250.31
-5	5	11	1	L	0.0	4.03	6	0	2	1		144.98	139.30
-5	6	2	1		224.23	211.78	6	0	4	1		67.93	69.33
-5	6	4	1		186.95	179.31	6	0	6	1		48.43	50.14
-5	6	6	1		113.97	109.20	6	1	1	1		85.70	83.96
-5	6	8	1		72.30	71.08	6	1	3	1		60.44	65.02
-5	6	10	1		46.85	49.58	6	1	5	1		40.83	39.95
-5	7	1	1		94.11	84.45	6	1	7	1	L	30.28	24.88
-5	7	3	1		81.04	73.37	6	2	0	1		141.52	147.45
-5	7	5	1		77.27	70.60	6	2	2	1		127.54	127.38
-5	7	7	1		48.76	46.58	6	2	4	1		79.22	81.50
-5	7	9	1	L	24.31	14.22	6	2	6	1		38.49	39.30
-5	8	2	1		67.42	70.70	6	3	1	1		144.67	142.41
-5	8	4	1		67.49	63.16	6	3	3	1		102.95	107.60
-5	8	6	1		40.51	38.45	6	3	5	1		53.55	54.13
-5	8	8	1	L	12.30	17.89	6	3	7	1	L	0.0	17.31
-5	8	10	1	L	0.0	9.56	6	4	0	1		69.33	69.58
-5	9	1	1		125.99	131.41	6	4	2	1		50.65	48.24
-5	9	3	1		139.12	140.60	6	4	4	1		35.43	38.46
-5	9	5	1		168.37	149.01	6	4	6	1	L	24.33	29.32
-5	9	7	1		131.33	120.32	6	5	1	1		69.83	66.99
-5	9	9	1		77.37	73.38	6	5	3	1		33.14	41.46

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
6	5	5	1		43.19	45.91	-6	4	6	1		29.54	35.93
6	6	0	1		149.67	137.08	-6	4	8	1		48.90	50.74
6	6	2	1		74.46	74.26	-6	4	10	1		34.31	35.33
6	6	4	1		34.26	37.02	-6	5	1	1		129.79	123.00
6	6	6	1	L	23.99	27.41	-6	5	3	1		139.22	130.18
6	7	1	1		43.18	42.88	-6	5	5	1		85.71	85.22
6	7	3	1		44.25	38.88	-6	5	7	1		47.92	50.62
6	7	5	1	L	11.10	24.47	-6	5	9	1		31.77	37.58
6	8	0	1		66.03	79.05	-6	5	11	1	L	17.79	19.14
6	8	2	1		79.50	83.18	-6	6	2	1		186.73	178.09
6	8	4	1		49.74	48.68	-6	6	4	1		175.90	168.38
6	8	6	1	L	18.97	13.86	-6	6	6	1		134.24	128.26
6	9	1	1		56.02	63.78	-6	6	8	1		85.78	89.71
6	9	3	1		42.69	43.45	-6	6	10	1		56.02	60.61
6	9	5	1	L	20.99	31.32	-6	7	1	1		39.80	38.09
6	10	0	1	L	0.0	3.37	-6	7	3	1		40.54	42.18
6	10	2	1	L	12.81	9.75	-6	7	5	1		43.98	41.91
6	10	4	1	L	15.88	9.78	-6	7	7	1		44.89	34.06
6	11	1	1		48.80	43.45	-6	7	9	1	L	23.36	29.40
6	11	3	1	L	0.0	18.73	-6	8	2	1		58.88	56.13
6	11	5	1	L	0.0	19.44	-6	8	4	1		80.54	78.29
6	12	0	1	L	23.38	13.39	-6	8	6	1		73.71	73.46
6	12	2	1	L	4.57	7.41	-6	8	8	1		37.40	37.92
6	12	4	1	L	13.94	11.50	-6	8	10	1	L	13.81	20.28
6	13	1	1	L	20.05	22.01	-6	9	1	1		64.90	64.60
6	13	3	1	L	13.10	12.34	-6	9	3	1		56.04	52.93
6	14	0	1	L	24.08	15.53	-6	9	5	1		63.98	68.48
6	14	2	1	L	0.0	9.62	-6	9	7	1		73.41	78.32
6	15	1	1	L	11.49	7.84	-6	9	9	1		49.36	57.29
6	16	0	1	L	12.00	14.12	-6	10	2	1	L	14.15	9.84
-6	0	2	1		322.25	295.34	-6	10	4	1	L	20.44	21.15
-6	0	4	1		237.04	236.25	-6	10	6	1	L	23.55	22.42
-6	0	6	1		161.16	171.93	-6	10	8	1	L	0.0	17.05
-6	0	8	1		125.98	138.25	-6	11	1	1		72.51	73.03
-6	0	10	1		88.19	90.29	-6	11	3	1		69.90	66.25
-6	1	1	1		105.90	93.46	-6	11	5	1		33.34	33.85
-6	1	3	1		116.95	106.54	-6	11	7	1		29.80	27.20
-6	1	5	1		87.13	91.99	-6	11	9	1	L	19.72	24.48
-6	1	7	1		32.15	42.01	-6	12	2	1		42.12	41.26
-6	1	9	1	L	11.68	7.30	-6	12	4	1		48.76	49.71
-6	1	11	1	L	20.73	23.19	-6	12	6	1	L	26.75	31.46
-6	2	2	1		140.36	118.57	-6	12	8	1	L	7.28	27.94
-6	2	4	1		65.60	63.82	-6	13	1	1	L	20.95	20.46
-6	2	6	1		39.68	44.35	-6	13	3	1	L	8.98	6.56
-6	2	8	1		34.42	37.70	-6	13	5	1	L	0.0	8.09
-6	2	10	1	L	21.55	19.41	-6	13	7	1		26.14	11.54
-6	3	1	1		175.69	178.24	-6	14	2	1	L	23.89	31.67
-6	3	3	1		253.30	243.35	-6	14	4	1		42.04	44.73
-6	3	5	1		249.31	253.67	-6	14	6	1		45.40	40.93
-6	3	7	1		183.61	188.82	-6	15	1	1	L	0.0	10.16
-6	3	9	1		107.49	111.55	-6	15	3	1	L	24.37	23.89
-6	3	11	1		56.00	60.99	-6	15	5	1		28.13	37.60
-6	4	2	1		75.83	66.10	-6	15	7	1	L	21.47	35.85
-6	4	4	1		26.10	22.41	-6	16	2	1	L	0.0	22.67

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
-6	16	4	1	L	19.53	19.61	-7	2	10	1		40.09	37.69
-6	17	1	1	L	0.0	14.30	-7	3	1	1		68.05	72.82
-6	17	3	1	L	0.0	18.38	-7	3	3	1		106.84	101.90
7	1	1	1		60.56	60.09	-7	3	5	1		90.86	93.81
7	1	3	1	L	28.54	19.59	-7	3	7	1		47.99	57.78
7	1	5	1	L	0.0	4.52	-7	3	9	1	L	32.44	31.29
7	2	0	1	L	25.17	12.70	-7	3	11	1	L	15.64	22.43
7	2	2	1	L	19.31	17.18	-7	4	2	1		66.52	61.42
7	2	4	1	L	0.0	15.22	-7	4	4	1		61.11	55.41
7	2	6	1	L	7.93	2.58	-7	4	6	1		48.23	47.30
7	3	1	1		44.43	40.42	-7	4	8	1		41.76	33.89
7	3	3	1	L	32.48	28.80	-7	4	10	1	L	31.78	27.44
7	3	5	1	L	17.65	18.76	-7	5	1	1	L	3.56	22.66
7	4	0	1		58.20	64.02	-7	5	3	1		38.91	44.85
7	4	2	1		51.03	57.63	-7	5	5	1		62.07	65.45
7	4	4	1	L	33.70	40.21	-7	5	7	1		51.00	53.98
7	4	6	1	L	30.53	20.78	-7	5	9	1	L	14.17	21.54
7	5	1	1	L	22.23	19.86	-7	5	11	1	L	0.0	7.95
7	5	3	1	L	23.29	16.57	-7	6	2	1		85.76	86.15
7	5	5	1	L	0.0	11.73	-7	6	4	1		78.24	81.06
7	6	0	1		82.85	87.59	-7	6	6	1		97.40	99.17
7	6	2	1		61.96	56.83	-7	6	8	1		98.06	90.77
7	6	4	1	L	17.42	24.58	-7	6	10	1		49.22	56.60
7	7	1	1		54.70	59.27	-7	7	1	1		70.41	72.08
7	7	3	1		39.96	45.06	-7	7	3	1		87.94	81.16
7	7	5	1	L	17.40	25.30	-7	7	5	1		62.06	63.41
7	8	0	1		49.58	53.88	-7	7	7	1	L	24.03	28.04
7	8	2	1		41.66	45.29	-7	7	9	1	L	25.71	21.78
7	8	4	1	L	28.33	33.34	-7	8	2	1		54.71	50.54
7	9	1	1		55.89	58.97	-7	8	4	1		33.44	33.84
7	9	3	1		40.30	45.99	-7	8	6	1	L	19.39	21.86
7	10	0	1		54.47	67.18	-7	8	8	1	L	24.48	19.31
7	10	2	1		45.41	45.27	-7	8	10	1	L	26.54	10.89
7	10	4	1	L	16.51	22.43	-7	9	1	1		84.79	93.91
7	11	1	1		39.11	38.77	-7	9	3	1		126.94	129.63
7	11	3	1	L	15.69	18.95	-7	9	5	1		132.24	126.19
7	12	0	1		73.47	77.27	-7	9	7	1		93.09	93.14
7	12	2	1		46.02	50.50	-7	9	9	1		62.13	65.65
7	13	1	1	L	26.78	32.90	-7	10	2	1		66.91	65.58
7	13	3	1	L	25.50	29.23	-7	10	4	1		51.23	53.21
7	14	0	1	L	18.85	27.88	-7	10	6	1		52.38	54.52
7	14	2	1		31.97	32.63	-7	10	8	1		40.51	43.17
7	15	1	1		32.75	33.11	-7	11	1	1		55.60	58.23
7	16	0	1	L	10.66	22.27	-7	11	3	1		56.50	59.65
-7	1	1	1		86.40	84.96	-7	11	5	1		46.15	42.74
-7	1	3	1		81.73	74.83	-7	11	7	1	L	25.93	27.00
-7	1	5	1		61.37	65.54	-7	11	9	1	L	9.57	19.31
-7	1	7	1		50.96	58.15	-7	12	2	1		86.78	91.32
-7	1	9	1	L	20.94	28.76	-7	12	4	1		92.14	91.33
-7	1	11	1	L	0.0	1.70	-7	12	6	1		86.00	82.26
-7	2	2	1		50.36	54.61	-7	12	8	1		72.38	64.97
-7	2	4	1		63.15	62.97	-7	13	1	1		34.60	38.54
-7	2	6	1	L	27.28	31.53	-7	13	3	1		43.92	42.16
-7	2	8	1	L	17.33	33.41	-7	13	5	1	L	28.03	27.88

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
-7	13	7	1	L	20.90	11.69	-8	1	9	1	L	27.12	33.59
-7	14	2	1		34.19	28.49	-8	1	11	1	L	26.06	28.19
-7	14	4	1		38.52	39.60	-8	2	2	1		78.29	76.02
-7	14	6	1		37.52	35.13	-8	2	4	1		99.17	97.51
-7	15	1	1		36.83	37.82	-8	2	6	1		84.08	90.34
-7	15	3	1		43.46	47.14	-8	2	8	1		49.33	56.31
-7	15	5	1		57.45	59.50	-8	2	10	1	L	20.36	22.90
-7	16	2	1	L	22.91	22.78	-8	3	1	1		121.53	130.03
-7	16	4	1	L	21.07	27.71	-8	3	3	1		180.59	171.50
8	0	0	1		113.15	113.86	-8	3	5	1		156.79	155.36
8	0	2	1		81.07	79.61	-8	3	7	1		108.53	114.48
8	0	4	1	L	33.85	31.72	-8	3	9	1		70.03	83.26
8	1	1	1		80.24	76.60	-8	3	11	1		44.02	53.19
8	1	3	1		43.72	50.24	-8	4	2	1		54.06	52.32
8	1	5	1	L	23.97	29.40	-8	4	4	1		56.86	57.48
8	2	0	1		48.72	58.65	-8	4	6	1		60.05	64.39
8	2	2	1		51.44	54.98	-8	4	8	1		43.31	44.06
8	2	4	1		43.43	43.99	-8	4	10	1	L	9.19	19.25
8	3	1	1		74.23	69.77	-8	5	1	1		115.84	113.73
8	3	3	1		49.24	47.02	-8	5	3	1		101.58	91.28
8	3	5	1		37.10	35.35	-8	5	5	1		59.35	59.58
8	4	0	1		55.37	63.83	-8	5	7	1		38.12	45.73
8	4	2	1		56.49	54.38	-8	5	9	1	L	25.66	28.82
8	4	4	1	L	27.87	32.12	-8	6	2	1		91.11	88.69
8	5	1	1		93.48	94.59	-8	6	4	1		90.80	88.72
8	5	3	1		51.38	50.86	-8	6	6	1		89.65	91.93
8	5	5	1	L	12.98	17.42	-8	6	8	1		85.46	85.22
8	6	0	1		80.24	81.58	-8	6	10	1		56.61	64.38
8	6	2	1		55.31	56.69	-8	7	1	1		38.23	33.88
8	6	4	1		39.89	27.31	-8	7	3	1		31.88	30.66
8	7	1	1	L	21.98	21.02	-8	7	5	1	L	28.52	7.39
8	7	3	1	L	14.74	15.74	-8	7	7	1	L	19.03	22.62
8	8	0	1		39.00	35.05	-8	7	9	1	L	30.99	32.47
8	8	2	1	L	24.91	30.98	-8	8	2	1		71.25	72.92
8	8	4	1	L	30.15	30.98	-8	8	4	1		83.55	83.61
8	9	1	1	L	25.96	16.57	-8	8	6	1		55.94	57.78
8	9	3	1	L	19.72	17.25	-8	8	8	1	L	34.60	35.41
8	10	0	1	L	16.94	11.54	-8	8	10	1	L	17.93	25.87
8	10	2	1	L	8.51	12.14	-8	9	1	1	L	29.79	30.97
8	11	1	1	L	24.34	29.30	-8	9	3	1		58.59	63.99
8	11	3	1	L	0.0	10.75	-8	9	5	1		82.56	82.18
8	12	0	1	L	20.54	18.42	-8	9	7	1		64.32	66.65
8	12	2	1	L	0.0	12.61	-8	9	9	1		38.31	37.08
8	13	1	1	L	17.82	11.74	-8	10	2	1	L	3.50	18.85
8	14	0	1	L	13.79	15.30	-8	10	4	1	L	22.18	22.03
-8	0	2	1		120.88	126.92	-8	10	6	1	L	22.04	15.20
-8	0	4	1		171.04	164.90	-8	10	8	1	L	0.0	9.17
-8	0	6	1		174.56	185.52	-8	11	1	1	L	29.30	33.50
-8	0	8	1		136.03	148.62	-8	11	3	1		37.90	32.08
-8	0	10	1		86.26	92.44	-8	11	5	1		47.59	46.89
-8	1	1	1		109.02	104.78	-8	11	7	1		40.14	46.79
-8	1	3	1		109.78	105.10	-8	12	2	1	L	14.98	20.33
-8	1	5	1		60.77	61.24	-8	12	4	1	L	7.66	2.16
-8	1	7	1	L	18.00	16.66	-8	12	6	1	L	21.48	28.50

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
-8	12	8	1	L	30.51	43.43	-9	4	10	1	L	20.52	17.79
-8	13	1	1	L	19.37	3.32	-9	5	1	1	L	24.58	34.67
-8	13	3	1	L	16.16	10.83	-9	5	3	1		46.97	48.57
-8	13	5	1	L	6.99	18.15	-9	5	5	1		41.51	42.70
-8	13	7	1	L	0.0	14.77	-9	5	7	1	L	12.94	18.54
-8	14	2	1	L	24.66	27.01	-9	5	9	1	L	0.0	16.09
-8	14	4	1	L	25.33	29.18	-9	6	2	1		54.12	60.50
-8	14	6	1	L	23.35	21.99	-9	6	4	1		90.89	91.19
-8	15	1	1	L	11.23	12.28	-9	6	6	1		95.95	94.14
-8	15	3	1	L	0.0	19.82	-9	6	8	1		55.92	66.52
-8	15	5	1	L	26.40	21.40	-9	6	10	1		38.57	40.07
9	1	1	1	L	26.21	38.17	-9	7	1	1		55.35	59.84
9	1	3	1	L	19.80	25.34	-9	7	3	1		57.29	61.05
9	2	0	1		20.64	24.53	-9	7	5	1		42.63	43.57
9	2	2	1	L	10.63	11.65	-9	7	7	1		41.70	36.49
9	2	4	1	L	19.06	10.24	-9	7	9	1	L	19.53	33.51
9	3	1	1	L	23.66	20.57	-9	8	2	1	L	29.82	36.19
9	3	3	1	L	17.76	10.99	-9	8	4	1		51.48	50.28
9	4	0	1		41.54	42.08	-9	8	6	1		45.50	52.26
9	4	2	1	L	22.89	21.90	-9	8	8	1		41.68	38.30
9	4	4	1	L	9.73	10.25	-9	9	1	1		51.23	61.62
9	5	1	1	L	12.14	19.60	-9	9	3	1		70.22	71.06
9	5	3	1	L	15.18	14.67	-9	9	5	1		69.14	66.91
9	6	0	1		40.10	39.01	-9	9	7	1		69.88	66.62
9	6	2	1	L	26.66	31.28	-9	9	9	1		64.23	59.10
9	7	1	1		33.70	41.08	-9	10	2	1		35.66	41.23
9	7	3	1	L	26.89	23.86	-9	10	4	1		47.18	49.84
9	8	0	1	L	12.24	22.93	-9	10	6	1		43.30	43.74
9	8	2	1	L	23.91	15.86	-9	10	8	1	L	23.25	18.65
9	9	1	1		35.31	36.47	-9	11	1	1		38.60	42.69
9	10	0	1		32.72	39.70	-9	11	3	1		41.14	35.06
9	10	2	1	L	24.83	34.92	-9	11	5	1	L	32.93	29.35
9	11	1	1		33.41	39.53	-9	11	7	1	L	14.41	27.30
9	12	0	1	L	29.81	35.57	-9	12	2	1		43.18	41.74
-9	1	1	1		32.63	31.16	-9	12	4	1		54.46	52.45
-9	1	3	1	L	26.28	25.09	-9	12	6	1		66.80	58.70
-9	1	5	1		35.28	35.57	-9	13	1	1		35.73	38.98
-9	1	7	1	L	23.47	24.66	-9	13	3	1		35.12	37.62
-9	1	9	1	L	23.14	19.30	-9	13	5	1	L	28.94	31.14
-9	1	11	1	L	19.57	25.12	-9	14	2	1	L	32.04	36.14
-9	2	2	1		31.10	33.10	-9	14	4	1		37.08	37.13
-9	2	4	1	L	22.55	22.48	10	0	0	1		47.34	51.09
-9	2	6	1		34.23	33.95	10	0	2	1		43.71	43.07
-9	2	8	1		35.62	41.48	10	1	1	1		45.77	49.42
-9	2	10	1	L	14.92	23.05	10	1	3	1	L	33.37	31.14
-9	3	1	1		33.34	36.03	10	2	0	1		62.31	66.39
-9	3	3	1		39.82	36.49	10	2	2	1		37.97	37.07
-9	3	5	1		32.14	25.40	10	3	1	1		42.59	41.92
-9	3	7	1		41.59	33.76	10	3	3	1	L	31.26	16.20
-9	3	9	1	L	29.69	37.36	10	4	0	1	L	25.69	30.99
-9	4	2	1		64.65	61.19	10	4	2	1	L	23.57	25.08
-9	4	4	1		70.60	66.64	10	5	1	1		36.94	40.54
-9	4	6	1		56.62	56.60	10	6	0	1	L	24.28	28.25
-9	4	8	1	L	29.95	37.64	10	6	2	1	L	27.72	26.25

H	K	L	G	C	F OBS	F CALC	H	K	L	G	C	F OBS	F CALC
10	7	1	1	L	28.01	32.69	-10	10	8	1	L	8.82	13.82
10	8	0	1		37.75	41.33	-10	11	1	1	L	7.32	17.10
10	9	1	1	L	74.78	70.05	-10	11	3	1		32.04	32.37
10	10	0	1	L	13.39	15.38	-10	11	5	1	L	34.07	38.46
-10	0	2	1		78.01	82.88	-10	11	7	1	L	21.18	29.37
-10	0	4	1		113.04	115.56	-10	12	2	1	L	18.03	4.37
-10	0	6	1		109.56	109.60	-10	12	4	1	L	20.71	21.93
-10	0	8	1		75.36	80.82	-10	12	6	1	L	29.69	35.69
-10	0	10	1		50.45	59.21	-10	13	3	1	L	20.69	20.67
-10	1	1	1		56.25	58.38	11	1	1	1	L	0.0	1.31
-10	1	3	1		38.31	48.29	11	2	0	1	L	0.0	7.41
-10	1	5	1		46.54	49.29	11	3	1	1	L	9.19	11.62
-10	1	7	1		59.94	61.46	11	4	0	1	L	2.78	31.36
-10	1	9	1		46.75	49.41	11	5	1	1	L	11.30	14.01
-10	2	2	1		90.03	93.40	11	6	0	1	L	11.24	18.92
-10	2	4	1		92.59	95.19	11	8	0	1	L	21.35	29.67
-10	2	6	1		63.18	66.82	-11	1	1	1	L	16.25	16.00
-10	2	8	1	L	31.13	29.57	-11	1	3	1	L	27.46	32.53
-10	2	10	1	L	7.17	15.04	-11	1	5	1		32.10	33.30
-10	3	1	1		67.25	68.90	-11	1	7	1	L	26.81	25.87
-10	3	3	1		74.84	77.37	-11	1	9	1	L	20.80	24.93
-10	3	5	1		80.96	82.43	-11	2	2	1	L	0.0	4.18
-10	3	7	1		85.91	88.78	-11	2	4	1	L	18.08	16.22
-10	3	9	1		69.04	76.31	-11	2	6	1		34.77	25.52
-10	4	2	1		52.39	50.97	-11	2	8	1	L	12.87	15.38
-10	4	4	1		64.14	61.38	-11	3	1	1	L	9.87	14.96
-10	4	6	1		37.13	40.50	-11	3	3	1	L	24.56	21.37
-10	4	8	1	L	19.66	6.75	-11	3	5	1	L	31.06	35.29
-10	4	10	1	L	20.62	22.87	-11	3	7	1		43.84	40.50
-10	5	1	1	L	25.34	35.60	-11	3	9	1	L	23.07	30.56
-10	5	3	1		41.24	46.43	-11	4	2	1		39.63	38.55
-10	5	5	1		61.07	63.82	-11	4	4	1	L	28.73	36.88
-10	5	7	1		56.72	59.43	-11	4	6	1	L	22.85	27.31
-10	5	9	1		37.86	42.42	-11	4	8	1	L	0.0	17.25
-10	6	2	1		36.32	39.85	-11	5	1	1	L	23.48	15.54
-10	6	4	1		64.92	63.83	-11	5	3	1	L	0.0	12.49
-10	6	6	1		73.48	77.06	-11	5	5	1	L	21.45	18.40
-10	6	8	1		66.99	69.34	-11	5	7	1	L	27.65	31.41
-10	7	1	1		35.27	34.42	-11	5	9	1	L	24.24	31.13
-10	7	3	1	L	11.63	24.09	-11	6	2	1		34.36	34.48
-10	7	5	1	L	25.32	26.48	-11	6	4	1		42.00	40.78
-10	7	7	1	L	28.88	32.59	-11	6	6	1	L	28.71	32.05
-10	7	9	1		36.34	24.46	-11	6	8	1	L	34.07	31.43
-10	8	2	1		54.46	55.40	-11	7	1	1	L	26.78	32.86
-10	8	4	1		48.41	47.59	-11	7	3	1		34.85	35.46
-10	8	6	1	L	28.95	39.04	-11	7	5	1		39.19	41.30
-10	8	8	1	L	34.10	35.38	-11	7	7	1	L	33.71	41.53
-10	9	1	1		35.15	33.08	-11	8	2	1		32.80	38.46
-10	9	3	1		47.71	42.10	-11	8	4	1		42.26	39.87
-10	9	5	1		40.24	32.16	-11	8	6	1		36.85	30.12
-10	9	7	1	L	24.46	16.83	-11	8	8	1	L	0.0	16.74
-10	10	2	1	L	18.22	20.14	-11	9	1	1	L	28.50	27.87
-10	10	4	1	L	17.37	14.42	-11	9	3	1	L	25.81	33.18
-10	10	6	1	L	0.0	6.90	-11	9	5	1		45.27	46.05

H	K	L	G	C	F OBS	F CALC
-11	9	7	1		61.16	51.36
-11	10	2	1		33.11	39.98
-11	10	4	1		43.17	43.88
-11	10	6	1	L	33.12	32.00
-11	11	3	1	L	30.89	28.70
-11	11	5	1	L	30.78	36.40
12	0	0	1	L	24.96	21.87
12	2	0	1	L	23.17	35.40
-12	0	2	1		40.85	41.56
-12	0	4	1		49.11	50.33
-12	0	6	1		52.45	53.37
-12	0	8	1		55.70	58.30
-12	1	1	1	L	17.41	32.01
-12	1	3	1		46.91	48.76
-12	1	5	1		55.62	61.66
-12	1	7	1		43.97	52.17
-12	1	9	1	L	22.68	24.61
-12	2	2	1		36.58	39.70
-12	2	4	1	L	32.20	33.16
-12	2	6	1		33.32	31.77
-12	2	8	1	L	32.17	38.96
-12	3	1	1	L	33.26	32.26
-12	3	3	1		37.49	38.41
-12	3	5	1		49.58	51.94
-12	3	7	1		57.20	55.44
-12	4	2	1		44.89	43.10
-12	4	4	1		32.34	34.15
-12	4	6	1	L	22.21	21.94
-12	4	8	1	L	24.48	30.97
-12	5	1	1		32.56	34.68
-12	5	3	1		44.55	53.06
-12	5	5	1		49.84	55.65
-12	5	7	1		44.64	43.52
-12	6	2	1	L	26.99	30.79
-12	6	4	1		42.80	41.27
-12	6	6	1		37.04	41.19
-12	7	3	1	L	10.03	23.75
-12	7	5	1	L	22.57	30.03
-12	7	7	1	L	17.95	20.57
-12	8	4	1	L	17.92	24.00
-12	8	6	1	L	32.69	32.27
-13	1	3	1	L	24.98	16.46
-13	1	5	1	L	0.0	10.01
-13	1	7	1	L	0.0	9.08
-13	2	4	1	L	12.06	11.28
-13	2	6	1	L	0.0	6.96
-13	3	3	1	L	11.44	12.25
-13	3	5	1	L	13.91	15.77
-13	4	4	1	L	11.91	19.95
-13	4	6	1	L	26.82	23.83