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Author
Conway, John G.

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John G. Conway, Earl F. Worden, Jean Blaise, and
Jean Verges

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For Reference

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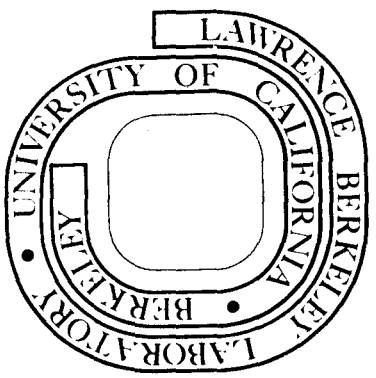

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THE INFRARED SPECTRUM OF CALIFORNIUM-249*

John G. Conway

Materials and Molecular Research Division, Lawrence Berkeley Laboratory
and Department of Chemistry, University of California,
Berkeley, California 94720

Earl F. Worden

Lawrence Livermore Laboratory, University of California
Livermore, California 94550

Jean Blaise and Jean Verges

Laboratoire Aimé Cotton, C.N.R.S. II 91405, Orsay, France

The ^{249}Cf spectrum has been reported between 3700 and 12,000 cm^{-1} on a high resolution Fourier Transform spectrometer at the Laboratoire Aimé Cotton. The spectrum was excited in an electrodeless discharge lamp which contained approximately 200 microgram of Cf as the triiodide.

The lamp outside diameter was 5 mm and it was 25 mm long. The lamp was prepared by subliming the triiodide into it under vacuum and and sealing it off.[1] It was operated in a cavity at 2450 M Hg with about 80 watts of power. One lamp was used throughout this investigation.

To obtain the best coverage two separate runs were made, one was between 3700 and 9418 cm^{-1} and the second between 9418 and 1200 cm^{-1}. In the first region 810,100 data points were taken in 12 hr and in the second region 500,100 data points were taken in 7 hr and 25 min. The spectrometer was operated in air at atmospheric pressure and the data corrected to vacuum.

A computer program performed the Fourier transformation and also selected the peaks and prints the vacuum wavenumber of the peak and

* Work done under the U. S. Energy Research and Development Administration.

its intensity. A paper chart recording of the spectrum is also produced. The computed peaks are checked against the chart to confirm the presence of the lines. The intensity, on a 0-9 scale, are estimated from the paper chart record.

The line list is in Table I. The first column is the vacuum wavenumber in units of cm^{-1}. The second column is line width information, the values are in units of 10^{-3} cm^{-1}. A E indicates an estimated width, a C indicates off diagonal components or weak components are present and a D is for a complex pattern probably of a low J or possibly a multiple line pattern and a * is where no degradation was observed. Column three is the estimated intensity on a 0-9 scale. Column four is a code to the structure of the line. A sharp line is indicated by 1, a blend by 3, and a wide line by a 4. A 5 indicates the hyperfine structure is degraded to higher wavenumbers, and a 6 is for a structure degraded to lower wavenumbers. A 7 is for a peculiar pattern that is not covered by the other codes.

The ground state of CF I is $^5I_8$ of the $5f^{10}7s^2$ configuration and the ground state of Cf II is $^6I_{17/2}$ of the $5f^{10}7s$ configuration. The line 9078.145 cm^{-1} is of special interest as it is a transition between the ground $^5I_8$ and the first excited state $^5I_7$ both of the same configuration $5f^{10}7s^2$. Parity forbidden transitions of this type are callisionally induced in relatively high pressure separation of electrodeless lamps and have been observed in Bk and Cm experiments.[3,4]

The chemical separation was not complete and there was some berkelum[3] and curium[4] in the sample. These lines have been removed from the list.

0 0 0 0 4 4 0 7 3 1 3

ACKNOWLEDGEMENTS

We wish to thank Tom Parsons for the help with the chemical preparations and Mrs. J. Chevellard for the computation and George V. Schlimoff for help in preparing the table.

One of us (J.G.C.) wishes to thank Professor P. Jacquinot and the Centre National de la Reckerche Scientifique who made possible his portion of the work at Laborataire Aimé Cotton.

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3. Earl F. Worden, John G. Conway, Jean Blaise, Pierre Camus and Jean Verges, LBL-4544, submitted to Spectrochimica Acta, Nov. 1975.
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Table I. The Cf-249 line list between 3500 and 1200 cm^{-1}.

CF LINE LIST				CF LINE LIST			
WAVE NUMBER	WIDTH	INT	CODE	WAVE NUMBER	WIDTH	INT	CODE
3496.20		0	4	4377.466	506	1	6
3810.551	E 260	0	5	4393.711		2	1
3817.788		0	1	4396.874	E 300	0	5
3934.007		0	1	4419.284	E 150	0	6
3941.128	321	0	6	4426.289		1	4
3950.75	E 300	0	6	4431.350	E 200	0	5
3953.729	E 300	0	7	4468.414		0	5
3954.418		0	4	4473.874		1	4
3974.103		1	1	4480.946		0	1
4004.46	167	2	6	4488.307		0	1
4011.091	231	0	6	4494.529		0	5
4035.816	166	1	6	4496.617		0	1
4037.454	166	1	5	4497.869		0	5
4046.850		0	7	4500.394		0	1
4050.474		0	4	4502.242	211	2	5
4091.751	0	1	7	4520.430		0	1
4092.561	E 240	0	6	4543.281		0	1
4117.170		0	4	4547.468		2	1
4126.209	E 350	1	6	4552.590	E 150	0	6
4139.037		0	4	4565.505		1	1
4149.742		0	4	4569.701	34	1	6
4168.181		0	4	4573.691	149	3	5
4170.945	E 100	0	6	4589.491		1	1
4178.261	E 100	1	5	4598.968		0	1
4185.873	36	0	5	4608.610	E 100	1	5
4203.867	E 300	0	6	4614.120	E 150	3	6
4211.629		2	1	4625.183		0	4
4214.869		0	1	4625.517	E 160	2	6
4252.563	0	0	7	4639.434	E 350	1	5
4255.183		1	6	4658.620	201	0	5
4264.773		0	1	4660.260		0	4
4267.986		0	4	4672.495	146	0	5
4299.845		1	7	4676.617		4	1
4308.760		0	4	4719.079		0	1
4316.752	508	4	6	4772.179	E 200	1	6
4317.802		1	1	4776.975	E 140	3	5
4320.208		0	4	4778.533	E 190	0	6
4323.856		0	5	4788.955		2	1
4333.800		1	6	4790.263	66	9	5
4337.221		0	4	4797.093	295	1	5
4344.618	E 220	0	5	4845.433	E 380	0	5
4353.574		1	1	4902.215	372	9	6
4360.667		3	1	4921.508	184	7	6
4370.774		0	4	4925.223	91	3	6
4371.872	E 150	0	6	4936.415	76	4	6

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
4972.329	194	6	5
4979.345	E 25	5	6
4999.296		0	1
5001.289	E 500	0	5
5002.771		0	1
5046.736	E 400	1	5
5046.509	E 240	1	6
5053.148	186	4	5
5056.812	208	6	6
5066.348		0	1
5074.115	E 300	1	5
5087.438	E 200	8	6
5090.108	92	3	5
5106.683	99	9	6
5170.032	264	9	6
5203.923	E 650	0	5
5220.321	E 200	3	6
5222.512		1	1
5222.832	40	1	6
5234.335		1	4
5242.761		9	4
5245.460	E 200	3	5
5269.525	440	1	6
5298.740	E 40	1	6
5322.494	E 400	0	4
5340.795	530	9	6
5365.678		0	4
5373.993	82	8	6
5379.321	75	0	5
5405.496	291	3	6
5417.839	E 100	1	6
5424.542	E 50	1	6
5441.556		0	1
5442.630		1	1
5477.344	478	0	5
5491.004	E 200	0	5
5497.975	E 50	1	5
5506.217		0	4
5522.548	E 30	0	6
5536.869	E 40	0	6
5541.856	E 1000	0	7
5557.488		0	4
5593.256	57	0	6
5599.773	E 100	2	6
5606.316	E 150	1	5

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
5610.249	455	8	6
5611.876	43	2	5
5665.378		0	1
5671.867	E 100	9	5
5688.656	561	1	5
5699.280	E 100	0	6
5707.225	189	0	5
5712.899		1	4
5717.767		2	4
5723.352	282	0	6
5725.789	204	0	5
5765.832		0	1
5788.743		0	1
5789.935	E 200	3	5
5804.550	E 100	0	5
5810.502	116	1	6
5810.508	184	0	5
5824.547	E 200	0	6
5824.900	E 150	0	5
5847.672		0	1
5857.242		2	4
5857.808		1	1
5858.219	E 40	1	5
5858.895	E 250	0	5
5867.002	E 50	0	6
5890.509	E 170	7	5
5905.720		1	1
5921.831	E 150	1	6
5945.732		7	1
5952.208	E 200	4	4
5959.293	373	0	5
5965.291		9	1
5971.666		0	1
5978.508	156	4	5
5985.164		0	4
5990.745		0	1
5997.200		0	4
6007.274	E 750	0	5
6016.882		0	1
6021.582		2	4
6033.946	241	0	5
6037.060	473	2	6
6040.281	87	2	5
6043.713	E 50	1	6
6048.587		0	4

OF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
6063.660	E 150	1	5
6069.062	450	0	6
6075.935	58	4	6
6082.842		5	4
6083.369		0	4
6095.605	E 80	0	6
6102.348	403	0	5
6104.750		0	1
6119.654	337	0	6
6122.302	184	5	6
6128.072		0	4
6132.520	74	0	5
6132.244		0	1
6153.896		0	4
6159.285	E 300	1	6
6165.376	E 450	0	6
6184.050	E 50	1	6
6186.099	E 250	0	6
6189.277		0	4
6190.799		0	1
6196.407		0	4
6198.124	E 200	4	5
6203.847		7	1
6212.838	54	8	6
6218.091		0	1
6221.018	64	1	5
6221.472	E 100	1	5
6223.630	295	1	6
6225.208	213	2	5
6232.782	E 50	0	5
6233.740		3	4
6239.570	E 100	0	6
6249.399		0	1
6257.493	E 350	1	5
6261.651	E 50	4	6
6270.540	E 50	0	5
6276.572	E 3000	0	7
6288.551		0	4
6293.042	E 100	0	6
6293.843		0	4
6295.178	41	2	6
6295.759	E 300	0	5
6298.570		0	1
6299.462		0	1
6309.666	73	1	6

OF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
6314.252	124	1	5
6341.576		0	4
6343.666	207	0	6
6345.056		0	4
6347.744		0	1
6356.340	200*	0	7
6361.371		2	1
6377.468		9	1
6403.047		6	1
6406.610		1	4
6409.724	E 80	1	5
6413.801		9	1
6416.359	E 400	0	6
6417.388	269	1	6
6422.783		8	1
6431.668		2	1
6437.960	E 150	0	5
6439.781	75	1	5
6455.731	175	1	6
6465.214	E 100	3	5
6481.344	E 30	0	6
6485.428		0	4
6493.414		1	4
6498.350		0	1
6502.470		0	1
6505.247	E 300	1	6
6511.823		0	1
6519.309		3	1
6521.870		2	1
6523.864	1670	7	7
6542.149	E 50	9	5
6548.332	E 50	3	5
6549.254	E 150	4	6
6565.710		1	1
6570.291	E 100	0	5
6572.316	34	1	6
6591.590		0	1
6593.469		0	1
6595.141	E 100	0	6
6596.259		0	1
6599.032		0	4
6604.085		0	1
6607.292	E 150	0	5
6614.169	E 150	1	5
6618.823		0	4

0 0 0 0 4 4 0 7 3 1 5

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
6634.115	164	2	6
6644.060		0	4
6650.369	E 150C	4	6
6651.037		0	1
6653.487	71	5	5
6673.265	E 100	1	5
6687.104	E 100*	0	7
6691.500		2	1
6697.648		0	4
6715.399		0	4
6718.081		0	4
6718.699		3	4
6732.295		0	4
6737.637		0	1
6741.176	E 100	0	5
6763.342	E 100	3	6
6767.488	84	9	6
6772.266	191	0	6
6776.396	195	0	5
6780.088	267	0	5
6786.916	339	0	6
6796.974	E 150	2	6
6806.636	60	1	5
6808.038	E 90	2	6
6814.807		3	1
6820.601	255	3	5
6842.104		0	1
6842.383		0	4
6854.709	183	3	6
6862.257		0	1
6864.672		0	4
6869.617	67	0	5
6875.162	100	1	5
6892.367		0	1
6903.616		0	1
6913.776	119	1	5
6921.375		0	1
6923.255		0	1
6929.216		0	4
6937.317		0	4
6951.077	E 100	0	4
6952.068	E 50	2	5
6958.137	E 200	0	6
6962.980		0	1
6968.748	E 100	0	5

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
6975.467	E 100	0	4
6988.269	112	2	6
6997.456	124	1	5
6999.705	83	0	5
7001.286		0	1
7008.894		2	1
7027.974	E 100	3	5
7045.568	E 200	2	5
7050.562	E 200	0	5
7052.118	61	3	5
7052.357	E 350	1	6
7054.019	229	0	5
7060.682	161	0	5
7063.535		0	1
7064.434		1	1
7078.348		1	1
7084.407		0	1
7100.968	E 40	2	6
7101.586	E 100	8	6
7103.772	E 500	1	6
7114.612	E 150	1	6
7123.109	100	0	6
7126.610	E 100	0	7
7128.767		0	1
7144.733	E 80	0	5
7158.348		0	1
7175.225		0	1
7183.790	E 80	0	5
7184.247		0	1
7187.069	58	1	5
7189.486		6	1
7209.713	65	0	5
7222.072	448	1	5
7226.941		0	4
7250.190		0	1
7250.582	E 300	1	6
7257.051	255	0	5
7259.362	231	0	6
7261.927		2	1
7263.608	85	1	6
7265.815	4630	2	6
7268.480	E 400	2	6
7317.751		0	4
7317.975	49	0	5
7332.777		0	4

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
7348.919	68	0	6
7356.539		0	1
7380.836	75	5	6
7391.422	E 200	0	5
7404.387	E 250	5	5
7419.432	65	9	6
7429.662	E 80	4	6
7443.259		0	1
7444.442	43	0	6
7469.212		0	4
7473.534	E 50	9	6
7481.315	E 60	9	5
7499.835	78	9	6
7500.226	E 150	8	5
7516.756		7	1
7521.350		3	4
7568.205		1	1
7570.191		0	1
7574.447	253	2	5
7582.210		1	1
7617.891		2	4
7622.505		6	1
7634.974	3170	2	7
7640.256		1	4
7661.859	56	0	6
7665.08	E 200	0	6
7675.279	39	0	5
7683.102		0	1
7712.579		0	4
7714.316		0	4
7714.984		1	1
7720.532		0	4
7731.410	127	4	5
7735.403	428	2	6
7739.154		0	4
7766.415		6	1
7775.575	E 450	2	5
7778.502		0	4
7781.760	87	1	5
7791.222		1	1
7794.780	278	4	5
7797.152		2	1
7817.053	86	9	6
7821.433		1	1
7822.293	102	5	6

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
7842.323	71	1	5
7847.650		1	1
7889.196		0	4
7930.264		0	1
7957.313	83	1	5
7961.090		0	4
7966.140		8	1
7973.356		8	1
7989.862	E 450	1	6
7997.536		0	4
7999.546		1	4
8008.039		1	1
8009.90	248	1	5
8011.777		0	1
8018.916	E 100	0	5
8034.739	E 100	7	6
8036.034	32	1	5
8038.017	200	9	5
8044.450		1	1
8057.309	259	7	5
8057.983		3	1
8091.474		1	1
8093.167	85	9	5
8101.527		0	1
8104.553		2	1
8120.530	E 100	3	5
8131.904		0	1
8148.925		0	1
8158.538		0	1
8167.023	E 50	2	5
8167.143		1	1
8176.893		1	1
8192.555		0	1
8205.879	E 50	9	6
8235.615		1	4
8238.30	E 200	0	1
8247.82	E 200	0	6
8265.944	E 350	2	6
8269.936	1700	1	7
8271.540	57	8	5
8272.657		0	1
8274.600		0	1
8279.347	83	0	5
8280.917		0	1
8282.373		1	1

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
8302.379		0	1
8304.428		0	1
8309.813		1	1
8325.757	104	2	6
8349.236		1	1
8366.219		0	1
8371.988		9	1
8372.945		6	1
8375.552	56	5	5
8381.165	E 150	2	5
8381.766		2	1
8388.832	1820	1	7
8394.833		2	1
8403.948	E 50	3	5
8405.681		1	6
8406.002		0	1
8432.069	E 350	0	6
8448.719		4	1
8460.958	E 450*	0	7
8482.909	E 500	3	5
8504.261		0	4
8525.606	E 200	3	6
8557.945		9	1
8560.469		1	1
8596.163		1	1
8596.859	31	3	5
8629.198		0	1
8631.371		0	1
8665.091	E 80	1	5
8667.967		3	1
8670.168	40	5	5
8684.036	E 60	3	6
8689.361		0	4
8725.768		0	4
8746.434	56	0	5
8767.787	57	1	6
8768.544	34	0	6
8775.405		7	1
8775.743		6	1
8781.750		0	1
8803.258		1	4
8808.099		1	6
8814.099	E 250	0	6
8831.360		0	1
8835.364		1	1

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
8836.768	E 350	0	6
8838.676		0	1
8846.989		9	1
8852.296		3	4
8897.162	E 250	4	5
8912.729	74	1	5
8914.244		1	4
8938.685	405	2	5
8940.45	E 400	0	5
8943.685		1	1
8948.529		0	1
8950.711		1	1
8951.829		0	1
8965.72	704	2	5
8966.644	581	1	6
8988.258		0	4
9002.376	E 400	0	6
9044.924		1	4
9061.371		0	4
9066.219	E 1500	3	5
9078.145		5	1
9079.640	E 3500	0	5
9094.053	74	7	5
9118.646	80	3	5
9126.752		0	6
9132.612	139	1	6
9142.815	E 50	0	6
9166.529		2	1
9169.009	E 500	0	5
9174.257		1	4
9194.745	100	3	5
9201.692		0	4
9236.259		0	1
9239.466	131	1	5
9244.617		1	1
9256.916		0	1
9284.250		3	1
9309.765		1	1
9315.378		0	1
9319.776		0	1
9320.474	4350	1	6
9340.011	67	7	5
9349.753		5	1
9350.188		0	1
9354.04	469	3	5

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
9364.009		3	5
9377.745		0	4
9389.327		0	1
9395.685		4	1
9411.16	E 200	1	6
9418.191	E 450	9	5
9438.652	E 80	1	6
9445.062		1	1
9456.419	312	5	6
9459.197	E 300	9	6
9471.649		3	1
9496.141		7	1
9505.340		0	1
9505.769		0	1
9507.203	E 150	1	6
9511.446		0	1
9513.943		0	1
9516.945		0	4
9524.717		2	1
9531.898		0	1
9538.129	149	2	5
9538.439		0	4
9543.02	262	3	6
9566.036		0	4
9567.338		0	1
9574.265		0	1
9575.317	E 200	2	5
9576.288	121	2	6
9584.288	64	1	6
9587.922		8	1
9593.104	E 200	1	6
9601.269		0	4
9606.615	E 600	2	5
9615.694		2	1
9638.594		5	5
9639.578	256	3	5
9651.342		1	4
9655.664	E 200	1	5
9698.160	97	9	5
9703.800	99	8	5
9710.524		2	1
9722.220		0	4
9722.847	51	6	5
9727.778	90	6	5
9733.842		0	1

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
9734.486		0	1
9744.346		1	1
9768.673		1	4
9769.954		0	1
9781.08	E 400	0	5
9789.124	E 150	3	6
9789.642	143	2	5
9798.048		0	1
9805.161	E 300	0	6
9813.098	465	7	6
9832.349		1	1
9841.843		2	1
9868.150		0	1
9875.263		5	1
9888.692	E 150	9	6
9889.839	E 200	9	5
9909.424		1	4
9914.601		1	1
9922.883	481	2	5
9929.938		0	1
9951.263		1	4
9953.375	E 150	4	6
9957.52	E 300	2	6
9968.081		2	1
9972.698	E 100	3	6
9985.548	248	2	5
9995.311		0	1
9997.278	E 150	1	6
10004.381	E 100	9	5
10005.872		1	1
10011.769	E 150	2	6
10012.917		2	1
10019.103		8	1
10021.937		9	1
10044.729	E 100*	2	4
10052.070		2	1
10058.529		3	1
10072.011		0	1
10076.154	E 100	1	6
10076.805		0	4
10079.709	233	9	6
10109.157		7	1
10116.485	122	9	5
10162.586		0	1
10166.608		0	1

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
10173.825		0	1
10181.548		0	1
10188.265		0	1
10189.034		0	1
10190.256		0	1
10197.011	E 100	1	6
10224.964	138	9	6
10228.545		0	1
10234.654		9	1
10244.099	E 300	6	5
10253.079		1	1
10257.317		0	1
10268.487		0	1
10274.180		1	1
10275.314	113	2	6
10279.241		1	4
10286.337		1	1
10287.873		1	4
10292.546		2	1
10295.732	E 200	1	5
10300.427		7	1
10301.173	E 100	9	4
10315.384		4	1
10319.920	E 500	0	6
10325.448	E 200	3	6
10328.669	E 80	0	5
10332.494		9	1
10332.876	E 100	1	6
10340.410		2	1
10340.717		1	4
10360.385		9	1
10364.058		7	1
10376.333	E 250	1	6
10382.560		0	4
10387.088		4	6
10393.406	E 200	2	5
10403.427	274	9	6
10404.573		0	1
10419.154		0	1
10421.768		4	1
10448.920		3	1
10450.701		2	1
10452.749		0	1
10456.962		0	1
10458.88	E 250	1	5

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
10460.091		0	1
10463.170	E 200	2	5
10464.259		0	1
10482.072		0	4
10495.029	85	1	6
10503.337		0	4
10506.353		0	1
10509.38	E 300	9	6
10510.477		1	4
10512.645		1	1
10525.196		0	4
10526.542		0	1
10528.415		0	1
10531.359		0	4
10547.486		2	1
10550.730		3	4
10553.701		0	4
10578.701		2	1
10628.722		0	4
10636.406		0	1
10640.542		0	1
10640.702		0	4
10646.153		0	4
10651.351		0	1
10653.125		0	1
10679.766	161	2	5
10690.453	E 250	0	4
10699.889		0	1
10706.345		9	1
10734.40	E 500	0	6
10734.860		0	1
10735.699		0	1
10739.30	E 200*	1	7
10755.196		0	1
10767.561		0	4
10776.797		0	1
10777.034		1	1
10777.473	E 150	2	5
10789.954		0	1
10792.092	E 600	4	5
10795.121		3	1
10811.30	361	2	5
10820.383		0	4
10824.015		0	4
10827.253		0	4

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
10828.469		2	4
10833.131	E 450	9	6
10839.153		0	1
10839.741	267	3	5
10856.629		7	1
10857.397		0	4
10858.791		6	1
10861.901		1	1
10864.792		1	1
10872.032		2	4
10874.506		0	1
10879.054		0	4
10891.819	199	2	5
10907.70	E 350	1	6
10927.749		0	1
10938.439		0	1
10946.213	E 250	1	6
10986.50	E 500	1	5
10993.648		3	1
10997.210		0	4
11020.907		1	4
11038.044		0	4
11048.227		0	4
11048.819		0	1
11051.121		0	1
11059.025	391	2	5
11061.201		0	4
11074.407		0	4
11079.133		0	1
11082.174		1	1
11087.696	E 300	7	6
11115.879		2	1
11122.30	E 300	0	5
11123.594		0	4
11167.673		1	1
11190.506		0	4
11219.162		0	4
11221.268		2	1
11228.061		1	1
11265.988		2	4
11293.465		0	4
11299.078		0	4
11336.430		0	1
11337.80	E 400	1	6
11351.867		0	4

CF LINE LIST

WAVE NUMBER	WIDTH	INT	CODE
11361.80	E 350	2	6
11369.540		0	4
11383.101		0	4
11415.302		3	1
11420.610		0	1
11446.458		1	4
11476.890		0	1
11485.427	E 250	1	6
11488.196	76	2	5
11500.357		0	1
11502.019		2	1
11523.715		0	4
11524.791		0	1
11541.569		0	4
11541.815		0	1
11602.169		1	4
11613.970		4	1
11664.697		0	4
11695.594	E 200	2	6
11744.049		0	4
11760.429		0	4
11835.691		2	1
11837.529		1	1
11868.322		3	4
11887.227	E 200	0	4
11905.875		0	4
11916.053		2	1
11925.925		0	4
11926.283		0	4
11952.395		0	4
11974.409		0	4
11995.344		9	1
11999.881		3	1

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TECHNICAL INFORMATION DIVISION
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720