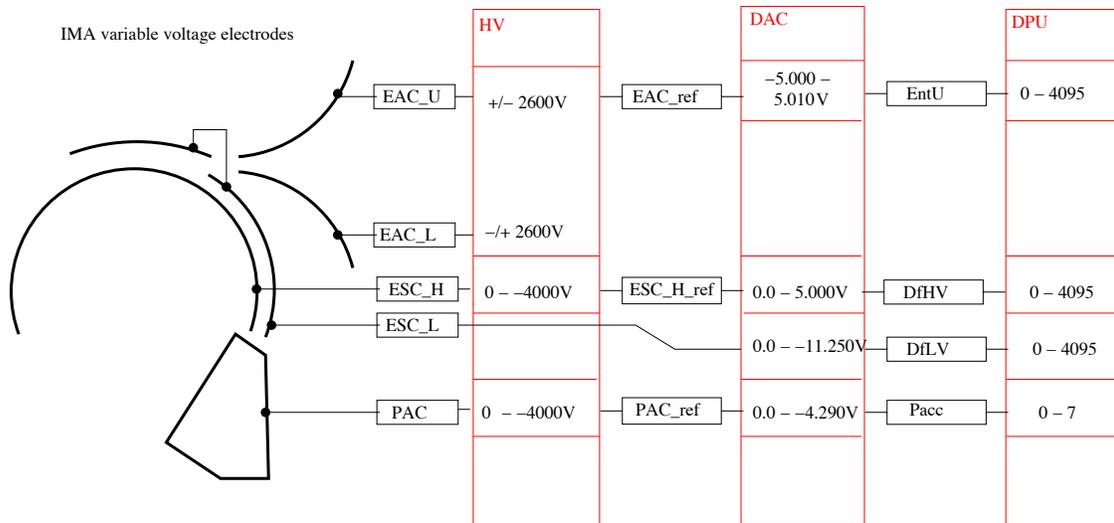# ICA Flight tables
V.2.0, May 9, 2002
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1 Notation

The general structure of variable voltages and system of notation is shown in figure below (ICA and IMA are equivalent):
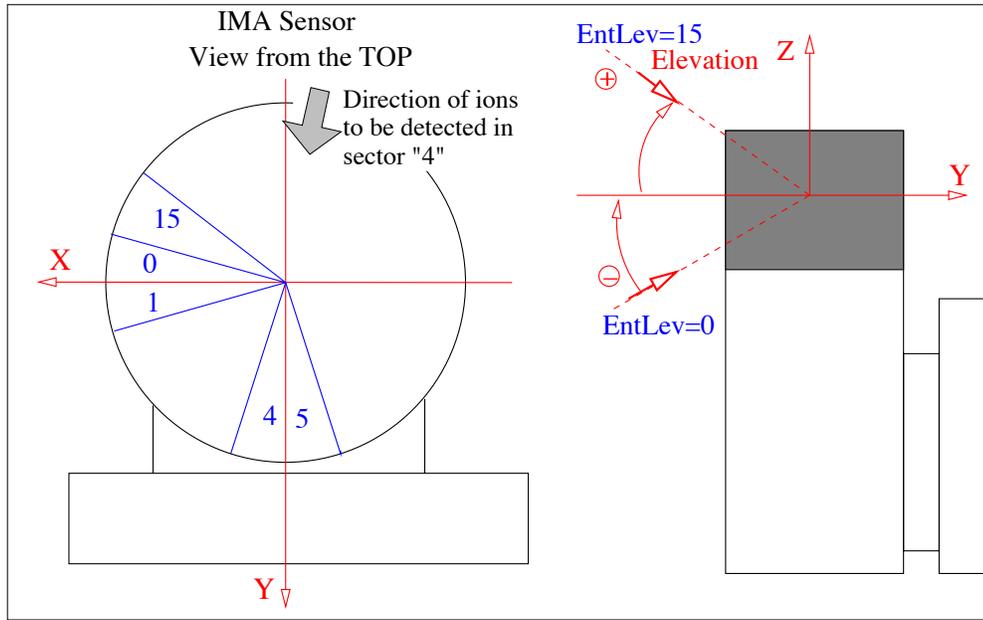

- EAC_U - voltage of the upper electrode of the scanner; EAC_ref, and EntU are reference voltage and digital reference respectively.

- EAC_L is the voltage of low electrode of scanner. It is controlled by the same references.

- ESC_H - voltage of the inner electrode of spherical analyzer (deflector); ESC_H_ref, and DfHV are reference voltage and digital reference respectively.

- ESC_L - low voltage at the outer electrode of the analyzer and top-hat; DfLV is corresponding digital reference.

- DflLev - number of energy step 0 - 95 (index of deflector voltage)

- EntLev - number of elevation angle 0 - 15 (index of voltage of entrance scanner)

- Pacc - digital reference of post-acceleration 0 -7

- PacLev - number of PAC level 0 - 2

- LookUpN - number of mass row in the mass look-up table

- M0, M1 - low and high number of the mass rings of given mass spot in the mass look-up table (the interval includes these values). Negative 1 means absence of this mass, or overlapping with more significant mass.

2 Coordinate system

The physical location of the azimuthal sectors are shown in the page 2. This figures shows as well the coordinate system used in the present document. In particular the right panel shows the elevation

angles notation. The mass rings in the azimuthal sector is numbered from the center toward periphery. I.e. the very central ring is "0".

3 Inputs

1. Energy range of ICA is **E0** →40000eV/Q. Here **E0** is defined by calibration from the scanner offset. See below. The range is divided into 96 energy steps uniformly in logarithmic scale. The energy less than 100eV/Q is controlled by ESC_L and energy greater than 100eV/Q is controlled by ESC_H.
   Conversion factor DfHV →ESC_H_ref is:

$$ESC\_H\_ref[mV] = -7.531 - 1.168 \cdot DfHV$$

   Conversion factor DfLV →ESC_L is

$$ESC\_L[mV] = 10.140 - 2.728 \cdot DfLV$$

2. Conversion factor EntU →EAC_ref is:

$$EAC\_ref[mV] = 9.856 + 2.447 \cdot EntU$$

   for $EntU \leq 2047$, and

$$EAC\_ref[mV] = -10029.4 + 2.451 \cdot EntU$$

   for $EntU > 2047$

3. Post-acceleration levels are chosen as follows:

PACLev	0	1	2
Pacc	0	3	6
RAC_ref[mV]	0.0	1869.0	3740.0

4. Masses resolved by the look-up table are chosen as follows:

LookUpN	0	1	2	3	4	5
Ion	H^+	$> O^+$	O^+	He^+	He^{++}	O^{++}
M/Q	1	32 (for calculations)	16	4	2	8

   (Letter of Hans Nilsson from Feb. 5, 2002)

4 Calibration summary

1. In case of ESC_L = 0.0 the median ion energy is:

$$E/Q[V] = 52.0 - ESC\_H\_ref[mV] \cdot 8.536$$

For low energies if $ESC\_H\_ref = 0.0$:

$$E/Q[V] = E_{INT} + ESC\_L[mV] \cdot 10.65 \cdot 10^{-3}$$

Here E_{INT} is the energy per charge calculated according to ESC_H_ref voltage.

2. The electrostatic scanner is characterized as follows:

$$El° = -2.47 - 189.8 \cdot D + 7.31 \cdot D^2 - 289.2 \cdot D^3$$

here

$$D = \frac{EAC\_ref[mV] - 15.9}{E/Q[V] - 16.0}$$

According to this formula, the minimun ions energy is 16eV/Q. The finit EAC_ref resolution and low energy limitation lead to impossibility to register particles less then

$$\textbf{E0} = \textbf{25eV/Q}$$

energy. The exterme elevation angles are $-39.0°$ and $41.0°$. Dividing this range into 16 levels gives $5.4°$ angular resolution. FWHM of elevation response is about $5°$, thus these two values correspond to each other. EAC HV converter is saturated when $EAC\_ref < -2920mv$ and when $EAC\_ref > 2950mv$. This corresponds to $EntU = 2900$ and $EntU = 1200$ respectively. See Table notes for more details.

3. Post-acceleration depends on the reference as follows:

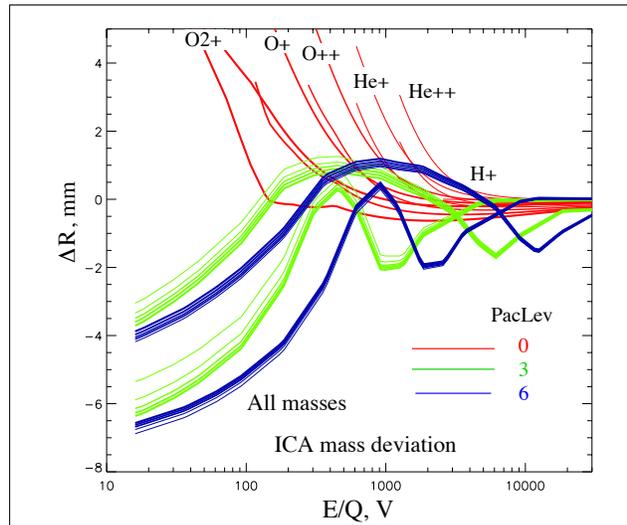$$PAC[V] = -40.088 + 0.966 \cdot PAC\_ref[mV]$$

Location of the mass-spot boundaries (at the FWHM) on the anode rings is described by:

$$M0 = -6.019 + 2.523 \cdot G - 0.031 \cdot G^2 - \Delta R_{M0}$$

$$M1 = -2.902 + 2.780 \cdot G - 0.043 \cdot G^2 - \Delta R_{M1}$$

Here $G = \frac{10^3}{\sqrt{(E/Q[V] + PAC[V]) \cdot M/Q}}$, M is the mass of the particle. ΔR is defined by diagram below.

3

5 Tables

Some important notes:

1. Energy steps are enumerated in energy encreasing order. DflLev = 0 means minimal energy and DflLev = 95 means maximum energy.

2. Due to the finite EAC_ref step and due to asymmetry of EAC HV source:

   (a) For low energy levels just a few randomly distributed angles are available. All available angles are grouped in clasters 2, 4, and 8 Elevation steps to allow make a correct averaging. Repeated EAC_ref are marked by "*" to be placed into "unreachable table".

   (b) For high energy levels some elevations are unreachable. These elevations correspond to EntU greater then 1200 for positive EAC_ref and less then 2900 for negative EAC_ref. Target angles which demands unavailable EntU are replaced in table 2 for neares available values and are marked by "*". Thus all bins marked "*" should be removed from a processed data stream.

3. For Look-up mass table:

   (a) M0 - M1 = "-1 - -1" means absence of this mass in the detector range;

   (b) If low-significant mass (with the greater LookUpN) is overlapped for more than 30% with high-significant mass (with the less LookUpN) the M0 - M1 = "-1 - -1" for the low-significant mass;

   (c) The lowest M0 is shifted down to 0, and the highest M1 is shifted up to 31 to fill the margin gaps;

   (d) The M1 of one mass spot and M0 of next mass spot are shifted toward each other to fill the intermediate gap.

4. To simplify the tables installation, each table in the text corresponds to the ASCII file delivered with the present document:
   Table 1 — ICAEnTableV1.txt
   Table 2 — ICAElTableV2.txt
   Table 3 — ICALookUp0V1.txt
   Table 4 — ICALookUp1V1.txt
   Table 5 — ICALookUp2V1.txt

Table 1: Energy - DfHV, DfLV

DflLev	DfLV	DfHV	ESC_L[mV]	ESC_H_ref[mV]	Eion[eV]
0	3489	1	-9507.9	-8.7	25.0
1	3419	1	-9316.9	-8.7	27.0
2	3344	1	-9112.3	-8.7	29.2
3	3263	1	-8891.3	-8.7	31.6
4	3175	1	-8651.3	-8.7	34.1
5	3080	1	-8392.1	-8.7	36.9
6	2978	1	-8113.8	-8.7	39.8
7	2867	1	-7811.0	-8.7	43.1
8	2747	1	-7483.7	-8.7	46.5

DflLev	DfLV	DfHV	ESC_L[mV]	ESC_H_ref[mV]	Eion[eV]
9	2618	1	-7131.8	-8.7	50.3
10	2478	1	-6749.8	-8.7	54.4
11	2327	1	-6337.9	-8.7	58.7
12	2164	1	-5893.3	-8.7	63.5
13	1987	1	-5410.4	-8.7	68.6
14	1797	1	-4892.1	-8.7	74.1
15	1591	1	-4330.1	-8.7	80.1
16	1368	1	-3721.8	-8.7	86.6
17	1127	1	-3064.3	-8.7	93.6
18	867	1	-2355.0	-8.7	101.2
19	586	1	-1588.5	-8.7	109.3
20	282	1	-759.2	-8.7	118.2
21	282	2	-759.2	-9.9	128.1
22	282	3	-759.2	-11.0	138.1
23	282	4	-759.2	-12.2	148.1
24	282	5	-759.2	-13.4	158.0
25	282	7	-759.2	-15.7	178.0
26	282	8	-759.2	-16.9	188.0
27	282	10	-759.2	-19.2	207.9
28	282	11	-759.2	-20.4	217.9
29	282	13	-759.2	-22.7	237.8
30	282	15	-759.2	-25.1	257.7
31	282	17	-759.2	-27.4	277.7
32	282	19	-759.2	-29.7	297.6
33	282	22	-759.2	-33.2	327.5
34	282	24	-759.2	-35.6	347.5
35	282	27	-759.2	-39.1	377.4
36	282	30	-759.2	-42.6	407.3
37	282	34	-759.2	-47.2	447.2
38	282	37	-759.2	-50.7	477.1
39	282	41	-759.2	-55.4	517.0
40	282	45	-759.2	-60.1	556.8
41	282	50	-759.2	-65.9	606.7
42	282	55	-759.2	-71.8	656.5
43	282	60	-759.2	-77.6	706.4
44	282	66	-759.2	-84.6	766.2
45	282	72	-759.2	-91.6	826.0
46	282	78	-759.2	-98.6	885.9
47	282	86	-759.2	-108.0	965.6
48	282	93	-759.2	-116.2	1035.4
49	282	102	-759.2	-126.7	1125.1
50	282	111	-759.2	-137.2	1214.9
51	282	121	-759.2	-148.9	1314.6
52	282	131	-759.2	-160.5	1414.3

DflLev	DfLV	DfHV	ESC_L[mV]	ESC_H_ref[mV]	Eion[eV]
53	282	143	-759.2	-174.6	1533.9
54	282	155	-759.2	-188.6	1653.5
55	282	169	-759.2	-204.9	1793.1
56	282	183	-759.2	-221.3	1932.7
57	282	199	-759.2	-240.0	2092.2
58	282	216	-759.2	-259.8	2261.7
59	282	234	-759.2	-280.8	2441.2
60	282	254	-759.2	-304.2	2640.6
61	282	275	-759.2	-328.7	2850.0
62	282	298	-759.2	-355.6	3079.3
63	282	323	-759.2	-384.8	3328.5
64	282	350	-759.2	-416.3	3597.7
65	282	380	-759.2	-451.4	3896.8
66	282	411	-759.2	-487.6	4205.9
67	282	445	-759.2	-527.3	4544.9
68	282	482	-759.2	-570.5	4913.8
69	282	522	-759.2	-617.2	5312.6
70	282	565	-759.2	-667.5	5741.3
71	282	611	-759.2	-721.2	6199.9
72	282	662	-759.2	-780.7	6708.4
73	282	716	-759.2	-843.8	7246.7
74	282	775	-759.2	-912.7	7835.0
75	282	838	-759.2	-986.3	8463.1
76	282	907	-759.2	-1066.9	9151.0
77	282	981	-759.2	-1153.3	9888.8
78	282	1061	-759.2	-1246.8	10686.4
79	282	1147	-759.2	-1347.2	11543.8
80	282	1241	-759.2	-1457.0	12481.0
81	282	1342	-759.2	-1575.0	13488.0
82	282	1451	-759.2	-1702.3	14574.7
83	282	1569	-759.2	-1840.1	15751.2
84	282	1697	-759.2	-1989.6	17027.4
85	282	1835	-759.2	-2150.8	18403.2
86	282	1984	-759.2	-2324.8	19888.8
87	282	2145	-759.2	-2512.9	21493.9
88	282	2319	-759.2	-2716.1	23228.7
89	282	2507	-759.2	-2935.7	25103.1
90	282	2710	-759.2	-3172.8	27127.0
91	282	2930	-759.2	-3429.8	29320.4
92	282	3167	-759.2	-3706.6	31683.3
93	282	3424	-759.2	-4006.8	34245.6
94	282	3701	-759.2	-4330.3	37007.3
95	282	4001	-759.2	-4680.7	39998.4

Table 2: Energy - Elevation - EntU

DflLev	Param	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	EntU	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
	El[deg]	-30.6	-30.6	-30.6	-30.6	-30.6	-30.6	-30.6	-30.6	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
1	EntU	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
	El[deg]	-25.2	-25.2	-25.2	-25.2	-25.2	-25.2	-25.2	-25.2	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
2	EntU	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
	El[deg]	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3	-21.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
3	EntU	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
	El[deg]	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	-18.4	11.7	11.7	11.7	11.7	11.7	11.7	11.7	11.7
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
4	EntU	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2
	El[deg]	-16.1	-16.1	-16.1	-16.1	-16.1	-16.1	-16.1	-16.1	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
5	EntU	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1
	El[deg]	-38.0	-38.0	-38.0	-38.0	-14.3	-14.3	-14.3	-14.3	8.1	8.1	8.1	8.1	31.9	31.9	31.9	31.9
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
6	EntU	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1
	El[deg]	-33.2	-33.2	-33.2	-33.2	-12.8	-12.8	-12.8	-12.8	6.7	6.7	6.7	6.7	27.3	27.3	27.3	27.3
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
7	EntU	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1
	El[deg]	-29.4	-29.4	-29.4	-29.4	-11.6	-11.6	-11.6	-11.6	5.6	5.6	5.6	5.6	23.6	23.6	23.6	23.6
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
8	EntU	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1
	El[deg]	-26.2	-26.2	-26.2	-26.2	-10.5	-10.5	-10.5	-10.5	4.7	4.7	4.7	4.7	20.5	20.5	20.5	20.5
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
9	EntU	5	5	5	5	4	4	3	3	2	2	1	1	0	0	0	0
	El[deg]	-38.2	-38.2	-38.2	-38.2	-23.5	-23.5	-9.7	-9.7	3.9	3.9	17.9	17.9	32.8	32.8	32.8	32.8
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
10	EntU	5	5	5	5	4	4	3	3	2	2	1	1	0	0	0	0
	El[deg]	-34.1	-34.1	-34.1	-34.1	-21.2	-21.2	-8.9	-8.9	3.2	3.2	15.6	15.6	28.7	28.7	28.7	28.7
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
11	EntU	5	5	5	5	4	4	3	3	2	2	1	1	0	0	0	0
	El[deg]	-30.7	-30.7	-30.7	-30.7	-19.2	-19.2	-8.2	-8.2	2.6	2.6	13.7	13.7	25.3	25.3	25.3	25.3
	Remove	*	*	*	*	*	*	*	*		*	*	*	*	*	*	*
12	EntU	6	6	5	5	4	4	3	3	2	2	1	1	0	0	4095	4095

Table 2: continued

DflLev	Param	EntLev: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	El[deg]	-38.5	-38.5	-27.7	-27.7	-17.5	-17.5	-7.7	-7.7	2.1	2.1	12.1	12.1	22.4	22.4	33.2	33.2
	Remove	*		*		*		*			*		*		*		*
13	EntU	6	6	5	5	4	4	3	3	2	2	1	1	0	0	4095	4095
	El[deg]	-34.7	-34.7	-25.2	-25.2	-16.0	-16.0	-7.1	-7.1	1.7	1.7	10.6	10.6	19.9	19.9	29.4	29.4
	Remove	*		*		*		*			*		*		*		*
14	EntU	7	7	6	6	5	5	4	3	2	1	0	0	4095	4095	4094	4094
	El[deg]	-40.4	-40.4	-31.5	-31.5	-22.9	-22.9	-14.7	-6.7	1.3	9.4	17.7	17.7	26.2	26.2	35.3	35.3
	Remove	*		*		*							*		*		*
15	EntU	7	7	6	6	5	5	4	3	2	1	0	0	4095	4095	4094	4094
	El[deg]	-36.6	-36.6	-28.6	-28.6	-21.0	-21.0	-13.6	-6.3	0.9	8.2	15.7	15.7	23.3	23.3	31.4	31.4
	Remove	*		*		*							*		*		*
16	EntU	8	8	7	7	6	5	4	3	2	1	0	4095	4094	4094	4093	4093
	El[deg]	-40.6	-40.6	-33.2	-33.2	-26.1	-19.3	-12.6	-6.0	0.6	7.3	14.0	20.9	28.1	28.1	35.7	35.7
	Remove	*		*											*		*
17	EntU	8	8	7	7	6	5	4	3	2	1	0	4095	4094	4094	4093	4093
	El[deg]	-36.9	-36.9	-30.3	-30.3	-23.9	-17.7	-11.6	-5.6	0.3	6.4	12.5	18.7	25.1	25.1	31.9	31.9
	Remove	*		*											*		*
18	EntU	9	9	8	7	6	5	4	3	2	1	0	4095	4094	4093	4092	4092
	El[deg]	-39.7	-39.7	-33.6	-27.7	-21.9	-16.3	-10.8	-5.4	0.1	5.6	11.1	16.7	22.6	28.6	34.9	34.9
	Remove	*		*													*
19	EntU	9	9	8	7	5	4	3	2	1	0	4095	4094	4093	4092	4091	4091
	El[deg]	-36.2	-36.2	-30.7	-25.4	-15.1	-10.1	-5.1	-0.1	4.9	9.9	15.0	20.3	25.7	31.3	37.1	37.1
	Remove	*															*
20	EntU	10	9	8	7	6	5	3	2	1	0	4095	4094	4093	4092	4091	4090
	El[deg]	-38.2	-33.1	-28.2	-23.3	-18.6	-14.0	-4.9	-0.3	4.2	8.8	13.5	18.2	23.1	28.1	33.3	38.7
	Remove																
21	EntU	11	10	9	7	6	5	4	2	1	0	4094	4093	4092	4091	4090	4089
	El[deg]	-39.4	-34.7	-30.2	-21.4	-17.2	-13.0	-8.8	-0.5	3.6	7.8	16.3	20.7	25.2	29.9	34.7	39.6
	Remove																
22	EntU	12	10	9	8	6	5	4	2	1	4095	4094	4093	4091	4090	4089	4088
	El[deg]	-40.5	-31.9	-27.8	-23.8	-16.0	-12.1	-8.3	-0.7	3.1	10.8	14.7	18.8	27.0	31.3	35.8	40.3
	Remove																
23	EntU	12	11	10	8	7	5	4	2	1	4095	4094	4092	4091	4090	4088	4087
	El[deg]	-37.3	-33.4	-29.6	-22.2	-18.5	-11.4	-7.9	-0.8	2.7	9.8	13.4	20.8	24.7	28.6	36.7	41.0
	Remove																
24	EntU	13	12	10	9	7	5	4	2	1	4095	4093	4092	4090	4089	4087	4086
	El[deg]	-38.4	-34.7	-27.6	-24.1	-17.4	-10.8	-7.5	-0.9	2.3	8.9	15.7	19.1	26.3	29.9	37.5	41.5

Table 2: continued

DflLev	Param	EntLev: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
25	EntU	15	13	11	10	8	6	4	2	0	4095	4093	4091	4089	4088	4086	4084
	El[deg]	-40.1	-33.6	-27.4	-24.4	-18.4	-12.6	-6.9	-1.1	4.6	7.5	13.4	19.4	25.7	28.9	35.5	42.4
	Remove																
26	EntU	15	14	12	10	8	6	4	2	0	4094	4092	4090	4089	4087	4085	4084
	El[deg]	-37.7	-34.7	-28.8	-23.1	-17.5	-12.0	-6.6	-1.2	4.2	9.7	15.3	21.0	23.9	30.0	36.2	39.5
	Remove																
27	EntU	17	15	13	11	9	7	4	2	0	4094	4092	4090	4087	4086	4084	4082
	El[deg]	-39.2	-33.8	-28.5	-23.4	-18.4	-13.5	-6.2	-1.3	3.5	8.4	13.4	18.5	26.3	29.1	34.6	40.4
	Remove																
28	EntU	18	16	13	11	9	7	4	2	0	4094	4091	4089	4087	4085	4083	4081
	El[deg]	-39.9	-34.7	-27.2	-22.3	-17.6	-12.9	-6.0	-1.4	3.2	7.9	15.0	19.8	24.8	30.0	35.3	40.8
	Remove																
29	EntU	19	17	15	12	10	7	5	2	0	4093	4091	4088	4086	4083	4081	4079
	El[deg]	-38.6	-33.9	-29.3	-22.7	-18.4	-12.0	-7.8	-1.5	2.7	9.0	13.4	20.0	24.5	31.6	36.5	41.5
	Remove																
30	EntU	21	18	16	13	10	8	5	2	4095	4093	4090	4087	4085	4082	4080	4077
	El[deg]	-39.7	-33.2	-29.1	-23.0	-17.0	-13.1	-7.3	-1.6	4.2	8.1	14.0	20.1	24.3	30.7	35.2	42.1
	Remove																
31	EntU	22	20	17	14	11	8	5	2	4095	4092	4089	4086	4084	4081	4078	4076
	El[deg]	-38.7	-34.7	-28.8	-23.2	-17.7	-12.3	-7.0	-1.6	3.7	9.1	14.6	20.2	24.1	30.0	36.2	40.5
	Remove																
32	EntU	24	21	18	15	12	8	5	2	4095	4092	4088	4085	4082	4079	4077	4074
	El[deg]	-39.6	-34.0	-28.7	-23.4	-18.3	-11.6	-6.6	-1.7	3.2	8.3	15.1	20.3	25.7	31.3	35.1	41.0
	Remove																
33	EntU	26	23	19	16	13	9	6	2	4094	4091	4087	4084	4081	4077	4074	4071
	El[deg]	-39.1	-34.1	-27.6	-22.9	-18.3	-12.2	-7.7	-1.8	4.2	8.7	14.9	19.6	24.5	31.2	36.4	41.8
	Remove																
34	EntU	27	24	21	17	13	9	6	2	4094	4090	4087	4083	4080	4076	4073	4070
	El[deg]	-38.3	-33.6	-29.0	-23.1	-17.3	-11.6	-7.4	-1.8	3.8	9.5	13.8	19.7	24.3	30.6	35.4	40.5
	Remove																
35	EntU	30	26	22	18	14	10	6	2	4094	4090	4086	4082	4078	4074	4070	4067
	El[deg]	-39.5	-33.7	-28.1	-22.7	-17.4	-12.2	-7.0	-1.9	3.3	8.5	13.8	19.2	24.8	30.5	36.5	41.2
	Remove																
36	EntU	32	28	24	20	15	11	6	2	4093	4089	4085	4080	4076	4072	4068	4064
	El[deg]	-39.1	-33.8	-28.6	-23.6	-17.4	-12.6	-6.7	-1.9	4.0	8.9	13.7	20.0	25.2	30.5	36.0	41.7
	Remove																

Table 2: continued

DflLev	Param	EntLev: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
37	EntU	35	31	26	21	16	12	7	2	4093	4088	4083	4078	4074	4069	4065	4061
	El[deg]	-39.1	-34.2	-28.4	-22.7	-17.1	-12.8	-7.3	-2.0	3.4	8.9	14.5	20.1	24.8	30.9	35.9	41.1
	Remove																
38	EntU	37	32	28	23	17	12	7	2	4092	4087	4082	4077	4072	4067	4063	4058
	El[deg]	-38.8	-33.1	-28.8	-23.4	-17.2	-12.1	-7.0	-2.0	4.1	9.2	14.4	19.7	25.2	30.8	35.5	41.6
	Remove																
39	EntU	40	35	30	24	19	13	7	2	4092	4086	4081	4075	4070	4065	4060	4055
	El[deg]	-38.8	-33.6	-28.6	-22.7	-17.9	-12.3	-6.7	-2.0	3.5	9.2	14.0	19.8	24.9	30.1	35.4	41.0
	Remove																
40	EntU	43	38	32	26	20	14	8	2	4091	4085	4079	4073	4068	4062	4057	4051
	El[deg]	-38.8	-34.0	-28.4	-22.9	-17.6	-12.4	-7.2	-2.1	4.0	9.2	14.5	20.0	24.6	30.4	35.4	41.6
	Remove																
41	EntU	47	41	35	28	22	15	8	1	4091	4084	4077	4071	4065	4059	4053	4047
	El[deg]	-39.0	-33.8	-28.6	-22.8	-17.9	-12.3	-6.8	-1.3	3.4	9.0	14.7	19.7	24.8	30.1	35.5	41.2
	Remove																
42	EntU	51	44	37	30	23	16	9	1	4090	4083	4076	4069	4062	4055	4049	4043
	El[deg]	-39.2	-33.6	-28.0	-22.7	-17.5	-12.3	-7.2	-1.4	3.7	8.8	14.1	19.4	24.9	30.6	35.7	40.9
	Remove																
43	EntU	54	47	40	33	25	17	9	1	4089	4082	4074	4066	4059	4052	4045	4038
	El[deg]	-38.7	-33.4	-28.3	-23.3	-17.7	-12.3	-6.9	-1.5	3.9	8.7	14.2	19.9	25.0	30.3	35.8	41.5
	Remove																
44	EntU	59	51	43	35	27	18	10	1	4089	4080	4072	4064	4056	4048	4040	4033
	El[deg]	-39.0	-33.5	-28.1	-22.9	-17.8	-12.1	-7.1	-1.6	3.4	9.1	14.2	19.4	24.8	30.3	36.1	41.3
	Remove																
45	EntU	64	55	47	38	29	20	10	1	4088	4079	4070	4061	4052	4044	4036	4028
	El[deg]	-39.4	-33.6	-28.6	-23.1	-17.8	-12.5	-6.8	-1.6	3.5	8.8	14.1	19.6	25.2	30.3	35.6	41.1
	Remove																
46	EntU	68	59	50	40	31	21	11	1	4087	4077	4068	4058	4049	4040	4031	4023
	El[deg]	-39.0	-33.6	-28.4	-22.8	-17.8	-12.4	-7.0	-1.7	3.7	9.1	14.1	19.7	24.9	30.3	35.9	41.0
	Remove																
47	EntU	74	64	54	44	33	23	12	1	4086	4075	4065	4054	4044	4034	4025	4016
	El[deg]	-39.0	-33.5	-28.2	-23.1	-17.5	-12.5	-7.1	-1.8	3.6	9.1	14.2	19.8	25.2	30.6	35.7	41.0
	Remove																
48	EntU	79	69	58	47	36	24	12	1	4085	4074	4062	4051	4040	4030	4020	4010
	El[deg]	-38.9	-33.8	-28.3	-23.0	-17.8	-12.3	-6.8	-1.8	3.7	8.8	14.4	19.7	25.2	30.3	35.5	41.0
	Remove																
49	EntU	86	75	63	51	38	26	13	1	4084	4071	4059	4047	4035	4024	4013	4002

Table 2: continued

DflLev	Param	EntLev: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	El[deg]	-39.0	-33.8	-28.4	-23.1	-17.4	-12.3	-6.9	-1.9	3.6	9.1	14.3	19.6	25.1	30.2	35.6	41.1
	Remove																
50	EntU	93	81	68	55	41	28	14	0	4083	4069	4056	4043	4030	4018	4006	3994
	El[deg]	-39.1	-33.9	-28.4	-23.1	-17.5	-12.4	-6.9	-1.5	3.5	9.0	14.2	19.6	25.0	30.2	35.6	41.2
	Remove																
51	EntU	100	87	73	59	45	30	15	0	4082	4067	4052	4038	4024	4011	3998	3986
	El[deg]	-38.9	-33.7	-28.2	-23.0	-17.8	-12.3	-7.0	-1.6	3.4	8.9	14.4	19.7	25.1	30.4	35.7	40.9
	Remove																
52	EntU	108	94	79	63	48	32	16	0	4080	4064	4049	4034	4019	4004	3990	3977
	El[deg]	-39.1	-33.9	-28.5	-22.8	-17.7	-12.3	-7.0	-1.6	3.7	9.1	14.2	19.5	24.9	30.5	35.9	41.1
	Remove																
53	EntU	117	101	85	69	52	35	17	0	4079	4061	4045	4028	4012	3996	3981	3967
	El[deg]	-39.1	-33.6	-28.3	-23.1	-17.7	-12.4	-6.9	-1.7	3.5	9.1	14.2	19.6	25.0	30.4	35.8	40.9
	Remove																
54	EntU	126	109	92	74	56	37	18	0	4077	4059	4040	4022	4005	3988	3972	3956
	El[deg]	-39.1	-33.7	-28.4	-23.0	-17.8	-12.3	-6.9	-1.8	3.6	8.8	14.4	19.8	25.0	30.4	35.7	41.1
	Remove																
55	EntU	136	118	99	80	60	40	20	0	4075	4055	4035	4016	3997	3979	3961	3944
	El[deg]	-38.9	-33.6	-28.2	-23.0	-17.6	-12.3	-7.1	-1.8	3.7	9.0	14.4	19.6	25.0	30.3	35.7	41.1
	Remove																
56	EntU	147	127	107	86	65	43	21	4095	4073	4052	4030	4009	3989	3969	3950	3932
	El[deg]	-39.1	-33.6	-28.4	-23.0	-17.7	-12.3	-7.0	-1.6	3.7	8.9	14.4	19.8	25.0	30.5	35.8	41.0
	Remove																
57	EntU	159	138	116	93	70	46	23	4095	4071	4048	4025	4002	3980	3958	3938	3918
	El[deg]	-39.1	-33.8	-28.4	-23.0	-17.7	-12.2	-7.1	-1.7	3.7	8.9	14.2	19.7	25.0	30.5	35.7	41.1
	Remove																
58	EntU	172	149	125	100	75	50	24	4095	4069	4044	4019	3994	3970	3947	3925	3903
	El[deg]	-39.1	-33.8	-28.4	-22.9	-17.6	-12.3	-6.9	-1.8	3.6	8.9	14.2	19.7	25.1	30.4	35.7	41.2
	Remove																
59	EntU	185	160	135	108	81	54	26	4094	4067	4039	4012	3986	3960	3935	3911	3888
	El[deg]	-39.0	-33.6	-28.4	-23.0	-17.6	-12.4	-7.0	-1.6	3.6	9.0	14.4	19.6	25.0	30.4	35.7	41.0
	Remove																
60	EntU	200	173	145	117	88	58	28	4094	4064	4035	4005	3977	3949	3921	3895	3870
	El[deg]	-39.0	-33.6	-28.2	-23.0	-17.7	-12.3	-7.0	-1.7	3.7	8.9	14.3	19.6	24.9	30.5	35.8	41.2
	Remove																
61	EntU	216	187	157	126	94	62	30	4094	4061	4029	3998	3967	3937	3907	3879	3852
	El[deg]	-39.0	-33.7	-28.4	-23.0	-17.6	-12.2	-7.0	-1.7	3.7	9.0	14.3	19.6	25.0	30.5	35.8	41.1

Table 2: continued

DflLev	Param	EntLev: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Remove																
62	EntU	233	202	169	136	102	67	32	4093	4059	4024	3990	3956	3923	3892	3861	3832
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.7	-12.3	-6.9	-1.6	3.5	8.9	14.2	19.7	25.1	30.4	35.8	41.1
	Remove																
63	EntU	252	218	183	147	110	73	35	4093	4055	4018	3981	3945	3909	3875	3842	3811
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.4	-7.0	-1.7	3.6	8.9	14.3	19.6	25.1	30.4	35.8	41.0
	Remove																
64	EntU	272	236	198	159	119	78	38	4093	4052	4011	3971	3932	3894	3857	3821	3787
	El[deg]	-39.0	-33.7	-28.4	-23.0	-17.7	-12.3	-7.1	-1.8	3.6	9.0	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
65	EntU	295	255	214	172	128	85	40	4092	4048	4004	3961	3918	3877	3837	3798	3761
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.4	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
66	EntU	318	275	231	185	138	91	43	4092	4044	3996	3950	3904	3859	3816	3774	3734
	El[deg]	-39.0	-33.7	-28.4	-23.0	-17.6	-12.3	-7.0	-1.8	3.6	9.0	14.3	19.6	25.1	30.4	35.8	41.1
	Remove																
67	EntU	344	297	249	200	149	98	47	4091	4039	3988	3938	3888	3840	3793	3748	3705
	El[deg]	-39.1	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.7	9.0	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
68	EntU	372	321	269	216	161	106	50	4090	4035	3979	3925	3871	3819	3768	3719	3673
	El[deg]	-39.1	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	9.0	14.2	19.7	25.0	30.4	35.8	41.1
	Remove																
69	EntU	402	347	291	233	174	115	54	4090	4029	3970	3910	3852	3796	3741	3689	3638
	El[deg]	-39.1	-33.7	-28.3	-23.0	-17.6	-12.4	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.7	41.1
	Remove																
70	EntU	434	375	314	252	188	124	58	4089	4024	3959	3895	3833	3771	3712	3655	3601
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.6	25.1	30.4	35.8	41.1
	Remove																
71	EntU	468	405	339	272	203	133	63	4088	4018	3948	3879	3811	3745	3681	3620	3561
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.1	30.4	35.8	41.1
	Remove																
72	EntU	507	438	367	294	220	144	68	4087	4011	3936	3861	3788	3716	3647	3580	3517
	El[deg]	-39.1	-33.7	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.6	25.1	30.4	35.8	41.1
	Remove																
73	EntU	547	473	396	318	237	156	73	4087	4004	3922	3842	3763	3685	3611	3539	3470
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.4	-7.0	-1.7	3.6	9.0	14.3	19.6	25.1	30.4	35.8	41.1
	Remove																

Table 2: continued

DflLev	Param	EntLev: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
74	EntU	592	512	429	343	256	168	79	4086	3996	3908	3821	3735	3652	3571	3493	3419
	El[deg]	-39.1	-33.7	-28.4	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
75	EntU	639	552	463	371	277	181	85	4085	3988	3893	3799	3706	3616	3529	3445	3365
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	41.0
	Remove																
76	EntU	691	597	500	401	299	196	92	4083	3979	3876	3774	3674	3577	3482	3391	3305
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
77	EntU	747	645	540	433	323	212	99	4082	3970	3858	3748	3640	3535	3432	3334	3241
	El[deg]	-39.1	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
78	EntU	807	697	584	468	349	228	107	4081	3959	3839	3720	3603	3489	3379	3273	3171
	El[deg]	-39.1	-33.7	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
79	EntU	871	753	631	505	377	247	115	4079	3948	3818	3689	3563	3440	3321	3206	3097
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	41.1
	Remove																
80	EntU	942	814	682	546	407	266	124	4078	3936	3795	3656	3519	3386	3258	3134	3016
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.1	30.4	35.8	41.0
	Remove																
81	EntU	1018	880	737	590	440	288	134	4076	3923	3770	3620	3473	3329	3190	3056	2928
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	9.0	14.3	19.6	25.0	30.4	35.8	41.1
	Remove																
82	EntU	1100	950	796	637	475	311	145	4074	3909	3744	3582	3422	3267	3116	2972	2972
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	30.4	35.8	35.8
	Remove																*
83	EntU	1188	1027	860	688	513	336	156	4072	3893	3715	3540	3368	3200	3037	3037	3037
	El[deg]	-39.0	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	9.0	14.3	19.6	25.0	30.4	30.4	30.4
	Remove															*	*
84	EntU	1110	1110	929	744	555	363	169	4070	3877	3684	3495	3308	3127	2951	2951	2951
	El[deg]	-33.7	-33.7	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	9.0	14.3	19.7	25.0	30.4	30.4	30.4
	Remove	*														*	*
85	EntU	1200	1200	1004	804	599	392	182	4068	3859	3651	3446	3244	3048	3048	3048	3048
	El[deg]	-33.7	-33.7	-28.3	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	25.0	25.0	25.0
	Remove	*													*	*	*
86	EntU	1085	1085	1085	869	648	423	197	4066	3839	3615	3393	3175	2963	2963	2963	2963

Table 2: continued

DflLev	Param	EntLev: 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	El[deg]	-28.3	-28.3	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	25.0	25.0	25.0	25.0
	Remove	*	*	*										*	*	*	*
87	EntU	1173	1173	1173	939	700	457	213	4063	3818	3576	3336	3101	3101	3101	3101	3101
	El[deg]	-28.3	-28.3	-28.3	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	19.7	19.7	19.7	19.7
	Remove	*	*										*	*	*	*	*
88	EntU	1014	1014	1014	1014	756	494	230	4060	3796	3533	3274	3020	3020	3020	3020	3020
	El[deg]	-23.0	-23.0	-23.0	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	19.7	19.7	19.7	19.7
	Remove	*	*	*									*	*	*	*	*
89	EntU	1096	1096	1096	1096	817	534	248	4057	3771	3488	3208	2933	2933	2933	2933	2933
	El[deg]	-23.0	-23.0	-23.0	-23.0	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	19.7	19.7	19.7	19.7	19.7
	Remove	*	*	*									*	*	*	*	*
90	EntU	1184	1184	1184	1184	883	577	268	4054	3745	3438	3136	3136	3136	3136	3136	3136
	El[deg]	-23.0	-23.0	-23.0	-23.0	-17.7	-12.3	-7.0	-1.7	3.6	9.0	14.3	14.3	14.3	14.3	14.3	14.3
	Remove	*	*	*									*	*	*	*	*
91	EntU	954	954	954	954	954	623	289	4050	3716	3385	3058	3058	3058	3058	3058	3058
	El[deg]	-17.6	-17.6	-17.6	-17.6	-17.6	-12.3	-7.0	-1.7	3.6	8.9	14.3	14.3	14.3	14.3	14.3	14.3
	Remove	*	*	*	*								*	*	*	*	*
92	EntU	1031	1031	1031	1031	1031	673	312	4046	3686	3328	2974	2974	2974	2974	2974	2974
	El[deg]	-17.7	-17.7	-17.7	-17.7	-17.7	-12.3	-7.0	-1.7	3.6	8.9	14.3	14.3	14.3	14.3	14.3	14.3
	Remove	*	*	*	*								*	*	*	*	*
93	EntU	1114	1114	1114	1114	1114	727	337	4042	3652	3265	3265	3265	3265	3265	3265	3265
	El[deg]	-17.7	-17.7	-17.7	-17.7	-17.7	-12.3	-7.0	-1.7	3.6	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	Remove	*	*	*	*							*	*	*	*	*	*
94	EntU	786	786	786	786	786	786	364	4037	3616	3198	3198	3198	3198	3198	3198	3198
	El[deg]	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-7.0	-1.7	3.6	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	Remove	*	*	*	*	*						*	*	*	*	*	*
95	EntU	849	849	849	849	849	849	394	4033	3577	3125	3125	3125	3125	3125	3125	3125
	El[deg]	-12.3	-12.3	-12.3	-12.3	-12.3	-12.3	-7.0	-1.7	3.6	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	Remove	*	*	*	*	*						*	*	*	*	*	*

Table 3: Energy - mass look-up table for PacLev = 0

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
0	0	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	1	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	2	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	3	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	4	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	5	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	6	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	7	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	8	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	9	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	10	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	11	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	12	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	13	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	14	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	15	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	16	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	17	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	18	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	19	-1 - -1	0 - 31	-1 - -1	-1 - -1	-1 - -1	-1 - -1
0	20	-1 - -1	0 - 26	27 - 31	-1 - -1	-1 - -1	-1 - -1
0	21	-1 - -1	0 - 26	27 - 31	-1 - -1	-1 - -1	-1 - -1
0	22	-1 - -1	0 - 25	26 - 31	-1 - -1	-1 - -1	-1 - -1
0	23	-1 - -1	0 - 25	26 - 31	-1 - -1	-1 - -1	-1 - -1
0	24	-1 - -1	0 - 24	25 - 31	-1 - -1	-1 - -1	-1 - -1
0	25	-1 - -1	0 - 23	24 - 31	-1 - -1	-1 - -1	-1 - -1
0	26	-1 - -1	0 - 23	24 - 31	-1 - -1	-1 - -1	-1 - -1
0	27	-1 - -1	0 - 22	23 - 31	-1 - -1	-1 - -1	-1 - -1
0	28	-1 - -1	0 - 22	23 - 31	-1 - -1	-1 - -1	-1 - -1
0	29	-1 - -1	0 - 21	22 - 31	-1 - -1	-1 - -1	-1 - -1
0	30	-1 - -1	0 - 21	22 - 27	-1 - -1	-1 - -1	28 - 31
0	31	-1 - -1	0 - 20	21 - 26	-1 - -1	-1 - -1	27 - 31
0	32	-1 - -1	0 - 20	21 - 26	-1 - -1	-1 - -1	27 - 31
0	33	-1 - -1	0 - 19	20 - 25	-1 - -1	-1 - -1	26 - 31
0	34	-1 - -1	0 - 19	20 - 24	-1 - -1	-1 - -1	25 - 31
0	35	-1 - -1	0 - 18	19 - 24	-1 - -1	-1 - -1	25 - 31
0	36	-1 - -1	0 - 17	18 - 23	-1 - -1	-1 - -1	24 - 31
0	37	-1 - -1	0 - 17	18 - 23	-1 - -1	-1 - -1	24 - 31
0	38	-1 - -1	0 - 16	17 - 22	-1 - -1	-1 - -1	23 - 31
0	39	-1 - -1	0 - 16	17 - 21	-1 - -1	-1 - -1	22 - 31
0	40	-1 - -1	0 - 15	16 - 21	28 - 31	-1 - -1	22 - 27
0	41	-1 - -1	0 - 14	15 - 20	27 - 31	-1 - -1	21 - 26
0	42	-1 - -1	0 - 14	15 - 20	27 - 31	-1 - -1	21 - 26

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
0	43	-1 - -1	0 - 13	14 - 19	26 - 31	-1 - -1	20 - 25
0	44	-1 - -1	0 - 13	14 - 18	26 - 31	-1 - -1	19 - 25
0	45	-1 - -1	0 - 12	13 - 18	25 - 31	-1 - -1	19 - 24
0	46	-1 - -1	0 - 12	13 - 17	24 - 31	-1 - -1	18 - 23
0	47	-1 - -1	0 - 11	12 - 16	24 - 31	-1 - -1	17 - 23
0	48	-1 - -1	0 - 11	12 - 16	23 - 31	-1 - -1	17 - 22
0	49	-1 - -1	0 - 10	11 - 15	22 - 28	29 - 31	16 - 21
0	50	-1 - -1	0 - 10	11 - 15	22 - 28	29 - 31	16 - 21
0	51	-1 - -1	0 - 9	10 - 14	21 - 27	28 - 31	15 - 20
0	52	-1 - -1	0 - 9	10 - 14	20 - 26	27 - 31	15 - 19
0	53	-1 - -1	0 - 8	9 - 13	20 - 26	27 - 31	14 - 19
0	54	-1 - -1	0 - 8	9 - 12	19 - 25	26 - 31	13 - 18
0	55	-1 - -1	0 - 8	9 - 12	18 - 24	25 - 31	13 - 17
0	56	-1 - -1	0 - 7	8 - 11	18 - 24	25 - 31	12 - 17
0	57	-1 - -1	0 - 7	8 - 11	17 - 23	24 - 31	12 - 16
0	58	-1 - -1	0 - 6	7 - 10	16 - 22	23 - 31	11 - 15
0	59	-1 - -1	0 - 6	7 - 10	16 - 21	22 - 31	11 - 15
0	60	-1 - -1	0 - 6	7 - 9	15 - 21	22 - 31	10 - 14
0	61	29 - 31	0 - 5	6 - 9	15 - 20	21 - 28	10 - 14
0	62	28 - 31	0 - 5	6 - 8	14 - 19	20 - 27	9 - 13
0	63	27 - 31	0 - 5	6 - 8	13 - 18	19 - 26	9 - 12
0	64	26 - 31	0 - 4	5 - 7	13 - 18	19 - 25	8 - 12
0	65	25 - 31	0 - 4	5 - 7	12 - 17	18 - 24	8 - 11
0	66	24 - 31	0 - 4	5 - 7	12 - 16	17 - 23	8 - 11
0	67	23 - 31	0 - 3	4 - 6	11 - 16	17 - 22	7 - 10
0	68	23 - 31	0 - 5	-1 - -1	11 - 15	16 - 22	6 - 10
0	69	22 - 31	0 - 4	-1 - -1	10 - 14	15 - 21	5 - 9
0	70	21 - 31	0 - 4	-1 - -1	10 - 14	15 - 20	5 - 9
0	71	20 - 31	0 - 4	-1 - -1	9 - 13	14 - 19	5 - 8
0	72	20 - 31	0 - 3	-1 - -1	9 - 12	13 - 19	4 - 8
0	73	19 - 31	0 - 3	-1 - -1	8 - 12	13 - 18	4 - 7
0	74	18 - 31	0 - 3	-1 - -1	8 - 11	12 - 17	4 - 7
0	75	17 - 31	0 - 2	-1 - -1	8 - 11	12 - 16	3 - 7
0	76	17 - 31	0 - 2	-1 - -1	7 - 10	11 - 16	3 - 6
0	77	16 - 31	0 - 2	-1 - -1	7 - 10	11 - 15	3 - 6
0	78	15 - 31	0 - 2	-1 - -1	6 - 9	10 - 14	3 - 5
0	79	15 - 31	0 - 1	-1 - -1	6 - 9	10 - 14	2 - 5
0	80	14 - 31	0 - 1	-1 - -1	6 - 8	9 - 13	2 - 5
0	81	13 - 31	0 - 1	-1 - -1	5 - 8	9 - 12	2 - 4
0	82	13 - 31	0 - 1	-1 - -1	5 - 7	8 - 12	2 - 4
0	83	12 - 31	0 - 1	-1 - -1	5 - 7	8 - 11	2 - 4
0	84	12 - 31	0 - 0	-1 - -1	4 - 7	8 - 11	1 - 3
0	85	11 - 31	0 - 0	-1 - -1	4 - 6	7 - 10	1 - 3

Table 3: continued

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
0	86	11 - 31	0 - 1	-1 - -1	2 - 6	7 - 10	-1 - -1
0	87	10 - 31	0 - 1	-1 - -1	2 - 5	6 - 9	-1 - -1
0	88	10 - 31	0 - 1	-1 - -1	2 - 5	6 - 9	-1 - -1
0	89	9 - 31	0 - 1	-1 - -1	2 - 5	6 - 8	-1 - -1
0	90	9 - 31	0 - 0	-1 - -1	1 - 4	5 - 8	-1 - -1
0	91	8 - 31	0 - 0	-1 - -1	1 - 4	5 - 7	-1 - -1
0	92	8 - 31	-1 - -1	0 - 0	1 - 4	5 - 7	-1 - -1
0	93	7 - 31	-1 - -1	0 - 0	1 - 3	4 - 6	-1 - -1
0	94	6 - 31	-1 - -1	0 - 0	1 - 5	-1 - -1	-1 - -1
0	95	5 - 31	-1 - -1	0 - 0	1 - 4	-1 - -1	-1 - -1

Table 4: Energy - mass look-up table for PacLev = 1

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
1	0	-1 - -1	0 - 14	-1 - -1	23 - 29	30 - 31	15 - 22
1	1	-1 - -1	0 - 14	-1 - -1	23 - 29	30 - 31	15 - 22
1	2	-1 - -1	0 - 14	-1 - -1	23 - 29	30 - 31	15 - 22
1	3	-1 - -1	0 - 14	-1 - -1	23 - 29	30 - 31	15 - 22
1	4	-1 - -1	0 - 14	-1 - -1	23 - 29	30 - 31	15 - 22
1	5	-1 - -1	0 - 14	-1 - -1	23 - 29	30 - 31	15 - 22
1	6	-1 - -1	0 - 14	-1 - -1	23 - 29	30 - 31	15 - 22
1	7	-1 - -1	0 - 14	-1 - -1	22 - 28	29 - 31	15 - 21
1	8	-1 - -1	0 - 14	-1 - -1	22 - 28	29 - 31	15 - 21
1	9	-1 - -1	0 - 13	-1 - -1	22 - 28	29 - 31	14 - 21
1	10	-1 - -1	0 - 13	-1 - -1	22 - 28	29 - 31	14 - 21
1	11	-1 - -1	0 - 13	-1 - -1	22 - 28	29 - 31	14 - 21
1	12	-1 - -1	0 - 13	-1 - -1	22 - 28	29 - 31	14 - 21
1	13	-1 - -1	0 - 13	-1 - -1	22 - 28	29 - 31	14 - 21
1	14	-1 - -1	0 - 13	-1 - -1	21 - 27	28 - 31	14 - 20
1	15	-1 - -1	0 - 13	-1 - -1	21 - 27	28 - 31	14 - 20
1	16	-1 - -1	0 - 12	-1 - -1	21 - 27	28 - 31	13 - 20
1	17	-1 - -1	0 - 12	-1 - -1	21 - 27	28 - 31	13 - 20
1	18	-1 - -1	0 - 12	-1 - -1	21 - 27	28 - 31	13 - 20
1	19	-1 - -1	0 - 12	-1 - -1	20 - 26	27 - 31	13 - 19
1	20	-1 - -1	0 - 12	-1 - -1	20 - 26	27 - 31	13 - 19
1	21	-1 - -1	0 - 11	-1 - -1	20 - 26	27 - 31	12 - 19
1	22	-1 - -1	0 - 11	-1 - -1	20 - 26	27 - 31	12 - 19
1	23	-1 - -1	0 - 11	-1 - -1	20 - 25	26 - 31	12 - 19
1	24	-1 - -1	0 - 11	-1 - -1	19 - 25	26 - 31	12 - 18
1	25	-1 - -1	0 - 10	-1 - -1	19 - 25	26 - 31	11 - 18
1	26	-1 - -1	0 - 10	-1 - -1	19 - 25	26 - 31	11 - 18
1	27	-1 - -1	0 - 10	-1 - -1	18 - 24	25 - 31	11 - 17

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
1	28	-1 - -1	0 - 10	-1 - -1	18 - 24	25 - 31	11 - 17
1	29	-1 - -1	0 - 9	-1 - -1	18 - 24	25 - 31	10 - 17
1	30	-1 - -1	0 - 9	-1 - -1	18 - 24	25 - 31	10 - 17
1	31	-1 - -1	0 - 9	-1 - -1	17 - 23	24 - 31	10 - 16
1	32	-1 - -1	0 - 9	-1 - -1	17 - 23	24 - 31	10 - 16
1	33	-1 - -1	0 - 6	7 - 10	17 - 23	24 - 31	11 - 16
1	34	-1 - -1	0 - 6	7 - 10	17 - 23	24 - 31	11 - 16
1	35	-1 - -1	0 - 6	7 - 10	17 - 22	23 - 31	11 - 16
1	36	-1 - -1	0 - 6	7 - 10	16 - 22	23 - 31	11 - 15
1	37	-1 - -1	0 - 6	7 - 10	16 - 22	23 - 31	11 - 15
1	38	-1 - -1	0 - 6	7 - 10	16 - 22	23 - 31	11 - 15
1	39	-1 - -1	0 - 6	7 - 10	16 - 22	23 - 31	11 - 15
1	40	-1 - -1	0 - 8	-1 - -1	16 - 22	23 - 31	9 - 15
1	41	-1 - -1	0 - 8	-1 - -1	16 - 22	23 - 31	9 - 15
1	42	-1 - -1	0 - 8	-1 - -1	16 - 22	23 - 31	9 - 15
1	43	-1 - -1	0 - 8	-1 - -1	16 - 22	23 - 31	9 - 15
1	44	-1 - -1	0 - 8	-1 - -1	16 - 21	22 - 31	9 - 15
1	45	30 - 31	0 - 8	-1 - -1	16 - 21	22 - 29	9 - 15
1	46	30 - 31	0 - 8	-1 - -1	16 - 21	22 - 29	9 - 15
1	47	30 - 31	0 - 8	-1 - -1	16 - 21	22 - 29	9 - 15
1	48	30 - 31	0 - 8	-1 - -1	15 - 21	22 - 29	9 - 14
1	49	29 - 31	0 - 8	-1 - -1	15 - 21	22 - 28	9 - 14
1	50	29 - 31	0 - 8	-1 - -1	15 - 20	21 - 28	9 - 14
1	51	28 - 31	0 - 7	-1 - -1	15 - 20	21 - 27	8 - 14
1	52	28 - 31	0 - 7	-1 - -1	14 - 20	21 - 27	8 - 13
1	53	28 - 31	0 - 7	-1 - -1	14 - 19	20 - 27	8 - 13
1	54	27 - 31	0 - 7	-1 - -1	14 - 19	20 - 26	8 - 13
1	55	27 - 31	0 - 6	-1 - -1	13 - 18	19 - 26	7 - 12
1	56	26 - 31	0 - 6	-1 - -1	13 - 18	19 - 25	7 - 12
1	57	26 - 31	0 - 6	-1 - -1	13 - 18	19 - 25	7 - 12
1	58	25 - 31	0 - 6	-1 - -1	12 - 17	18 - 24	7 - 11
1	59	25 - 31	0 - 6	-1 - -1	12 - 17	18 - 24	7 - 11
1	60	24 - 31	0 - 5	-1 - -1	12 - 16	17 - 23	6 - 11
1	61	24 - 31	0 - 5	-1 - -1	12 - 16	17 - 23	6 - 11
1	62	23 - 31	0 - 5	-1 - -1	11 - 16	17 - 22	6 - 10
1	63	23 - 31	0 - 5	-1 - -1	11 - 15	16 - 22	6 - 10
1	64	22 - 31	0 - 3	4 - 6	11 - 15	16 - 21	7 - 10
1	65	22 - 31	0 - 3	4 - 6	10 - 14	15 - 21	7 - 9
1	66	21 - 31	0 - 3	4 - 5	10 - 14	15 - 20	6 - 9
1	67	21 - 31	0 - 3	4 - 5	10 - 14	15 - 20	6 - 9
1	68	20 - 31	0 - 2	3 - 5	10 - 13	14 - 19	6 - 9
1	69	20 - 31	0 - 2	3 - 5	9 - 13	14 - 19	6 - 8
1	70	19 - 31	0 - 2	3 - 5	9 - 12	13 - 18	6 - 8

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
1	71	19 - 31	0 - 2	3 - 4	9 - 12	13 - 18	5 - 8
1	72	18 - 31	0 - 2	3 - 4	8 - 11	12 - 17	5 - 7
1	73	17 - 31	0 - 2	3 - 4	8 - 11	12 - 16	5 - 7
1	74	17 - 31	0 - 1	2 - 3	7 - 10	11 - 16	4 - 6
1	75	16 - 31	0 - 1	2 - 3	7 - 10	11 - 15	4 - 6
1	76	16 - 31	0 - 2	-1 - -1	7 - 10	11 - 15	3 - 6
1	77	15 - 31	0 - 2	-1 - -1	6 - 9	10 - 14	3 - 5
1	78	14 - 31	0 - 1	-1 - -1	6 - 9	10 - 13	2 - 5
1	79	14 - 31	0 - 1	-1 - -1	6 - 8	9 - 13	2 - 5
1	80	13 - 31	0 - 1	-1 - -1	5 - 8	9 - 12	2 - 4
1	81	13 - 31	0 - 1	-1 - -1	5 - 7	8 - 12	2 - 4
1	82	12 - 31	0 - 1	-1 - -1	5 - 7	8 - 11	2 - 4
1	83	12 - 31	0 - 0	-1 - -1	4 - 6	7 - 11	1 - 3
1	84	11 - 31	0 - 0	-1 - -1	4 - 6	7 - 10	1 - 3
1	85	11 - 31	0 - 0	-1 - -1	4 - 6	7 - 10	1 - 3
1	86	10 - 31	0 - 0	-1 - -1	4 - 5	6 - 9	1 - 3
1	87	10 - 31	0 - 1	-1 - -1	2 - 5	6 - 9	-1 - -1
1	88	9 - 31	0 - 1	-1 - -1	2 - 5	6 - 8	-1 - -1
1	89	9 - 31	0 - 0	-1 - -1	1 - 4	5 - 8	-1 - -1
1	90	8 - 31	-1 - -1	0 - 1	2 - 4	5 - 7	-1 - -1
1	91	8 - 31	-1 - -1	0 - 1	2 - 4	5 - 7	-1 - -1
1	92	8 - 31	-1 - -1	0 - 0	1 - 3	4 - 7	-1 - -1
1	93	7 - 31	-1 - -1	0 - 0	1 - 3	4 - 6	-1 - -1
1	94	7 - 31	-1 - -1	0 - 0	1 - 3	4 - 6	-1 - -1
1	95	5 - 31	-1 - -1	0 - 0	1 - 4	-1 - -1	-1 - -1

Table 5: Energy - mass look-up table for PacLev = 2

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
2	0	-1 - -1	0 - 11	-1 - -1	18 - 23	24 - 31	12 - 17
2	1	-1 - -1	0 - 11	-1 - -1	18 - 23	24 - 31	12 - 17
2	2	31 - 31	0 - 11	-1 - -1	18 - 23	24 - 30	12 - 17
2	3	31 - 31	0 - 11	-1 - -1	18 - 23	24 - 30	12 - 17
2	4	31 - 31	0 - 11	-1 - -1	18 - 23	24 - 30	12 - 17
2	5	31 - 31	0 - 11	-1 - -1	18 - 23	24 - 30	12 - 17
2	6	31 - 31	0 - 10	-1 - -1	18 - 23	24 - 30	11 - 17
2	7	31 - 31	0 - 10	-1 - -1	18 - 22	23 - 30	11 - 17
2	8	31 - 31	0 - 10	-1 - -1	17 - 22	23 - 30	11 - 16
2	9	31 - 31	0 - 10	-1 - -1	17 - 22	23 - 30	11 - 16
2	10	31 - 31	0 - 10	-1 - -1	17 - 22	23 - 30	11 - 16
2	11	30 - 31	0 - 10	-1 - -1	17 - 22	23 - 29	11 - 16
2	12	30 - 31	0 - 10	-1 - -1	17 - 22	23 - 29	11 - 16

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
2	13	30 - 31	0 - 10	-1 - -1	17 - 22	23 - 29	11 - 16
2	14	30 - 31	0 - 10	-1 - -1	17 - 22	23 - 29	11 - 16
2	15	30 - 31	0 - 10	-1 - -1	17 - 22	23 - 29	11 - 16
2	16	30 - 31	0 - 10	-1 - -1	17 - 22	23 - 29	11 - 16
2	17	30 - 31	0 - 9	-1 - -1	16 - 21	22 - 29	10 - 15
2	18	30 - 31	0 - 9	-1 - -1	16 - 21	22 - 29	10 - 15
2	19	29 - 31	0 - 9	-1 - -1	16 - 21	22 - 28	10 - 15
2	20	29 - 31	0 - 12	-1 - -1	13 - 21	22 - 28	-1 - -1
2	21	29 - 31	0 - 11	-1 - -1	12 - 21	22 - 28	-1 - -1
2	22	29 - 31	0 - 11	-1 - -1	12 - 21	22 - 28	-1 - -1
2	23	29 - 31	0 - 11	-1 - -1	12 - 21	22 - 28	-1 - -1
2	24	29 - 31	0 - 11	-1 - -1	12 - 20	21 - 28	-1 - -1
2	25	28 - 31	0 - 11	-1 - -1	12 - 20	21 - 27	-1 - -1
2	26	28 - 31	0 - 11	-1 - -1	12 - 20	21 - 27	-1 - -1
2	27	28 - 31	0 - 10	-1 - -1	11 - 20	21 - 27	-1 - -1
2	28	28 - 31	0 - 10	-1 - -1	11 - 20	21 - 27	-1 - -1
2	29	28 - 31	0 - 10	-1 - -1	11 - 19	20 - 27	-1 - -1
2	30	27 - 31	0 - 10	-1 - -1	11 - 19	20 - 26	-1 - -1
2	31	27 - 31	0 - 10	-1 - -1	11 - 19	20 - 26	-1 - -1
2	32	27 - 31	0 - 9	-1 - -1	10 - 19	20 - 26	-1 - -1
2	33	27 - 31	0 - 9	-1 - -1	10 - 18	19 - 26	-1 - -1
2	34	26 - 31	0 - 9	-1 - -1	10 - 18	19 - 25	-1 - -1
2	35	26 - 31	0 - 6	-1 - -1	13 - 18	19 - 25	7 - 12
2	36	26 - 31	0 - 6	-1 - -1	13 - 18	19 - 25	7 - 12
2	37	25 - 31	0 - 6	-1 - -1	13 - 17	18 - 24	7 - 12
2	38	25 - 31	0 - 5	-1 - -1	12 - 17	18 - 24	6 - 11
2	39	25 - 31	0 - 5	-1 - -1	12 - 17	18 - 24	6 - 11
2	40	25 - 31	0 - 5	-1 - -1	12 - 16	17 - 24	6 - 11
2	41	24 - 31	0 - 5	-1 - -1	12 - 16	17 - 23	6 - 11
2	42	24 - 31	0 - 5	-1 - -1	11 - 16	17 - 23	6 - 10
2	43	24 - 31	0 - 4	-1 - -1	11 - 16	17 - 23	5 - 10
2	44	24 - 31	0 - 4	-1 - -1	11 - 16	17 - 23	5 - 10
2	45	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	46	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	47	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	48	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	49	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	50	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	51	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	52	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	53	23 - 31	0 - 4	-1 - -1	11 - 15	16 - 22	5 - 10
2	54	23 - 31	0 - 7	-1 - -1	8 - 15	16 - 22	-1 - -1
2	55	22 - 31	0 - 7	-1 - -1	8 - 15	16 - 21	-1 - -1

PacLev	LookUpN DflLev	0 H^+	1 $> O^+$	2 0^+	3 He^+	4 He^{++}	5 O^{++}
2	56	22 - 31	0 - 7	-1 - -1	8 - 15	16 - 21	-1 - -1
2	57	22 - 31	0 - 6	-1 - -1	7 - 14	15 - 21	-1 - -1
2	58	22 - 31	0 - 6	-1 - -1	7 - 14	15 - 21	-1 - -1
2	59	21 - 31	0 - 6	-1 - -1	7 - 14	15 - 20	-1 - -1
2	60	21 - 31	0 - 6	-1 - -1	7 - 14	15 - 20	-1 - -1
2	61	21 - 31	0 - 6	-1 - -1	7 - 13	14 - 20	-1 - -1
2	62	20 - 31	0 - 4	-1 - -1	9 - 13	14 - 19	5 - 8
2	63	20 - 31	0 - 3	-1 - -1	9 - 13	14 - 19	4 - 8
2	64	19 - 31	0 - 3	-1 - -1	9 - 12	13 - 18	4 - 8
2	65	19 - 31	0 - 3	-1 - -1	9 - 12	13 - 18	4 - 8
2	66	19 - 31	0 - 3	-1 - -1	8 - 12	13 - 18	4 - 7
2	67	18 - 31	0 - 3	-1 - -1	8 - 11	12 - 17	4 - 7
2	68	18 - 31	0 - 3	-1 - -1	8 - 11	12 - 17	4 - 7
2	69	17 - 31	0 - 2	-1 - -1	8 - 11	12 - 16	3 - 7
2	70	17 - 31	0 - 2	-1 - -1	7 - 10	11 - 16	3 - 6
2	71	16 - 31	0 - 2	-1 - -1	7 - 10	11 - 15	3 - 6
2	72	16 - 31	0 - 2	-1 - -1	7 - 10	11 - 15	3 - 6
2	73	16 - 31	0 - 2	-1 - -1	7 - 10	11 - 15	3 - 6
2	74	15 - 31	0 - 2	-1 - -1	7 - 9	10 - 14	3 - 6
2	75	15 - 31	0 - 2	-1 - -1	6 - 9	10 - 14	3 - 5
2	76	15 - 31	0 - 2	-1 - -1	6 - 9	10 - 14	3 - 5
2	77	14 - 31	0 - 1	-1 - -1	6 - 8	9 - 13	2 - 5
2	78	14 - 31	0 - 0	1 - 2	6 - 8	9 - 13	3 - 5
2	79	13 - 31	0 - 0	1 - 2	5 - 8	9 - 12	3 - 4
2	80	13 - 31	0 - 0	1 - 2	5 - 8	9 - 12	3 - 4
2	81	12 - 31	0 - 1	-1 - -1	5 - 7	8 - 11	2 - 4
2	82	12 - 31	0 - 1	-1 - -1	5 - 7	8 - 11	2 - 4
2	83	11 - 31	0 - 0	-1 - -1	4 - 6	7 - 10	1 - 3
2	84	11 - 31	0 - 0	-1 - -1	4 - 6	7 - 10	1 - 3
2	85	10 - 31	0 - 0	-1 - -1	4 - 6	7 - 9	1 - 3
2	86	10 - 31	0 - 0	-1 - -1	4 - 5	6 - 9	1 - 3
2	87	10 - 31	0 - 0	-1 - -1	3 - 5	6 - 9	1 - 2
2	88	9 - 31	0 - 0	-1 - -1	3 - 5	6 - 8	1 - 2
2	89	9 - 31	-1 - -1	0 - 1	2 - 4	5 - 8	-1 - -1
2	90	8 - 31	-1 - -1	0 - 1	2 - 4	5 - 7	-1 - -1
2	91	8 - 31	-1 - -1	0 - 1	2 - 4	5 - 7	-1 - -1
2	92	7 - 31	-1 - -1	0 - 0	1 - 3	4 - 6	-1 - -1
2	93	7 - 31	-1 - -1	0 - 0	1 - 3	4 - 6	-1 - -1
2	94	7 - 31	-1 - -1	0 - 0	1 - 3	4 - 6	-1 - -1
2	95	5 - 31	-1 - -1	0 - 0	1 - 4	-1 - -1	-1 - -1