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TABLE OF NUCLEAR LEVEL LIFETIMES

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The table of lifetimes includes experimental data obtained from direct and indirect measurements of the lifetimes of excited states of atomic nuclei. It is a continuation of the table contained in Ref. [1]. The data have been systematized on the basis of an information retrieval system developed by the Data Centre of the Leningrad Institute of Nuclear Physics (LIYaF) [2]. Tables with data published up to the start of 1974 have been issued in a LIYaF preprint [3].

The table contains values for the lifetimes of bound states - i.e. of nuclear levels below the binding energy of a peripheral proton and a neutron in the nucleus and, in the case of light nuclei ($Z \leq 20$), below the alpha particle binding energy.

The table has nine columns. Column 1 gives the atomic number of the element and column 2 its chemical symbol; column 3 gives the mass number; column 4 gives the energy of the excited state in MeV; column 5 indicates the quantity measured (the half-life $T_{\frac{1}{2}}$, the level width Γ, or the reduced probability, B(EL), of an electric transition of multipolarity L).

The reduced probabilities of transitions, B(EL), in the table correspond to transitions connecting ground with excited nuclear states. The values of B(EL) are given in the following units: $e^2\sigma^L = e^2 \cdot (10^{-24})^L$ cm^2. The EB(EL) quantities denote partial reduced probabilities of transitions.

The level width associated with a transition to the ground state of a nucleus is denoted by $\Gamma 0$. The partial width in respect of the gamma discharge of a level is represented by ΓG and the total width by G. The G in front of the $\Gamma 0$ denotes a statistical factor and J denotes the level spin.

The half-life ($T_{\frac{1}{2}}$), level width (Γ) and reduced probability B(EL) data are presented in column 6, where the first number is the measured quantity and the number in parentheses is the order of magnitude. The values of the level half-lives is in seconds and Γ is in eV.

Column 7 contains the measurement error in the last significant figures of the result; thus, 5.20(- 12)28 means $(5.20 \pm 0.28) \cdot 10^{-12}$.

The experimental method by which the value in column 7 is obtained is indicated in column 8 as follows:

ВИ - time measurements, including observation of the decline in radiation activity, comparison of the number of excited nuclei with the number of excited nucleus disintegration events, pulsating beam method, oscilloscope and long-range alpha methods, method of delayed coincidences of electrons and gamma rays with gamma rays, and microwave method.

КВ - Coulomb excitation of nuclei by charged particles and heavy ions.

Р4 - Particle scattering. This sympol covers work on the inelastic scattering of heavy particles and of electrons.

РР - resonance scattering of gamma rays by nuclei.

М - Mössbauer effect measurements.

Д - Doppler effect; measurements of line broadening and of "weakening of the Doppler shift" and measurements - by means of the Doppler shift - of the velocities of recoil nuclei.

П - recoil nucleus method with measurement of the recoil distance (plunger method).

The cited literature is presented in column 9.

An automatic table print-out sample is presented on the next page.

REFERENCES

[1] BERLOVICH, Eh.E., VASILENKO, S.S., NOVIKOV, Yu.N., Lifetimes of excited states of atomic nuclei (in Russian), "Nauka" (1972).

[2] KONDUROV, I.A., PETROV, Yu.N. et al., in "Bulletin of the LIYaF Data Centre", issue 1, Leningrad (1974) 19.

[3] BERLOVICH, Eh.E., VAJSHNENE, L.A. et al., preprint LIYaF-145, Leningrad (1975).

3	LI	6	2.180	B(E2)	5.5(-3)		KB	72OS1835
3	LI	6	3.560	Γ	6.5	+24-17	PP	73SA0001
3	LI	7	0.477	T1/2	3.8(-14)	7	A	72CA0009
3	LI	7	0.477	T1/2	< 7(-14)		A	72BE0178
3	LI	7	0.477	T1/2	5.5(-14)	17	A	73BE0249
3	LI	7	0.4779	B(E2)	7.4(-4)	1	KB	72BA0193
3	LI	7	0.478	B(E2)	8.3(-4)	6	K	73HA0613
3	LI	8	0.981	T1/2	9.7(-15)	3	A	72CO0176
5	B	10	0.717	T1/2	> 4.1(-13)		A	72BE0178
5	B	11	2.120	Γ	2.3(-1)	9	PP	73SA0001
5	B	11	2.120	T1/2	2.0(-15)	8	PP	73SA0001
5	B	11	2.120	T1/2	< 6.9(-14)		A	72NY0175
5	B	11	2.140	T1/2	< 7(-14)		A	72BE0178
5	B	11	4.440	T1/2	< 6.9(-14)		A	72NY0175
5	B	11	4.440	Γ	5.3(-1)	21	PP	73SA0001
6	C	12	4.450	T1/2	< 3.5(-14)		A	72BE0178
6	C	12	15.109	Γ	3.70(+1)	11	P4	73CH0023
6	C	14	6.090	T1/2	< 6.9(-14)		A	72NY0175
6	C	14	6.89	T1/2	2.5(-14)	3	A	73SE0052
7	N	13		Γ	3.615(+4)	54		73CL1770
7	N	14	2.310	T1/2	5.2(-14)	13	A	72RE0470
7	N	14	2.310	T1/2	< 6.9(-14)		A	72NY0175
7	N	14	2.31	T1/2	7.9(-14)	2	A	73HA0289
7	N	14	3.95	T1/2	< 1.9(-14)		A	73HA0289
7	N	14	3.950	T1/2	< 1.4(-13)		Γ	72NY0175
7	N	14	4.910	T1/2	< 1.4(-13)		A	72NY0175
7	N	14	4.91	T1/2	< 1.9(-14)		A	73HA0289
7	N	14	5.110	T1/2	> 6.9(-12)		A	72NY0175
7	N	14	5.690	T1/2	< 8.3(-15)		A	72RE0470
7	N	14	5.690	T1/2	< 6.9(-14)		A	72NY0175
7	N	14	5.69	T1/2	< 1.5(-14)		A	73HA0289
7	N	14	5.830	T1/2	> 6.9(-12)		A	72NY0175
7	N	14	6.20	T1/2	1.40(-13)	31	A	73HA0289
7	N	14	6.44	T1/2	4.4(-13)	7	A	73HA0289
7	N	15	7.300	T1/2	< 6.9(-14)		A	72ST0353
7	N	15	8.310	T1/2	< 6.9(-14)		A	72ST0353
7	N	15	8.570	T1/2	< 6.9(-14)		A	72ST0353
7	N	15	9.050	T1/2	< 6.9(-14)		A	72ST0353
7	N	15	9.152	T1/2	< 2.7(-14)		A	72ST0353
7	N	15	9.220	T1/2	< 8.9(-14)		A	72ST0353
7	N	15	9.930	T1/2	< 6.9(-14)		A	72ST0353
7	N	17	1.850	T1/2	> 2(-12)			73BE0079
7	N	17	1.907	T1/2	> 3(-12)			73BE0079
7	N	17	2.526	T1/2	> 2(-12)			73BE0079
7	N	17	3.204	T1/2	< 2(-12)			73BE0079
7	N	17	3.629	T1/2	> 1(-12)			73BE0079
8	O	16	6.05	T1/2	6.7(-11)	5	BИ	73BI0217
8	O	16	6.13	T1/2	1.84(-11)	5	BИ	73BR0617
8	O	16	6.92	Γ	1.30(-1)	9	P4	73BE0609
8	O	16	9.85	Γ	8.8(-3)	17	P4	73BE0609
8	O	16	10.34	Γ	5.6(-8)	20	P4	73BE0609
8	O	16	11.52	Γ	6.1(-1)	2	P4	73BE0232
8	O	18	1.980	T1/2	2.25(-12)	37		73OL2239
8	O	18	1.982	T1/2	2.25(-12)	14		73MC0013
8	O	18	1.98216	T1/2	2.0(-12)	+6-4	A	73OL2239
8	O	18	3.550	T1/2	< 5(-12)			73OL2239
8	O	18	3.553	T1/2	> 3.5(-12)			73MC0013
8	O	18	3.55507	T1/2	> 3(-12)		A	73OL2239
8	O	18	3.630	T1/2	1.69(-12)	35		73OL2239
8	O	18	3.632	T1/2	1.01(-12)	17	A	73WA0418
8	O	18	3.632	T1/2	9.2(-13)	14		73WA0418
8	O	18	3.65450	T1/2	9.2(-13)	14	A	73OL2239
8	O	18	3.920	T1/2	1.0(-13)	6		73OL2239
8	O	18	3.9206	T1/2	1.7(-14)	7	A	73OL2239
8	O	18	4.450	T1/2	< 3.5(-14)			73OL2239
8	O	18	4.4561	T1/2	4.5(-14)	10	A	73OL2239
8	O	18	5.0985	T1/2	4.3(-14)	17	A	73OL2239