Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 114, 1189 (2013)	1-Apr-2013

Q(β^-)=14030 *10*; S(n)=3542 *11*; S(p)=15310 *70*; Q(α)=−10970 *70* 2012Wa38

1974Ro31: ^{28}Na was produced from 24-GeV proton spallations on uranium target at CERN, products were trapped in heated graphite, ions produced by surface ionization were accelerated, separated in a magnetic prism, and refocused on an electron multiplier. Deduced half-life and delayed neutron emission probability.

2006FuZX: He(^{28}Na,X), ^{40}Ar primary beam, E=63 MeV/nucleon, fragmented on a C target, reaction products were analyzed by RIKEN projectile fragment separator, identified by energy loss and time-of-flight; ^{28}Na secondary beam, E=40 MeV/nucleon, bombarded a liquid helium target; γ rays were detected by an array consists of 18 sets, each 2 HPGe planer, detectors; reported 5 γ rays associated with ^{28}Na; these are 278.2 keV *6*, 405.7 keV *10*, 635.9 keV *4*, 861.2 keV *12*, and 1302.7 keV *23* γ rays. Among these only 861.2γ is reported in other references.

2002Pr12: ^{197}Au(^{28}Na,^{28}Na′γ), ^{28}Na secondary beam, E=43.1 MeV/nucleon, produced from ^{40}Ar primary beam, E=90 MeV/nucleon, fragmentation on a Be target; ^{28}Na secondary beam bombarded a gold target; deduced Coulomb and matter deformation parameters of B_c=0.30 *7* and B_α=0.34 *8*, respectively, intrinsic quadrupole moment Q_0=33 fm^2 8 and a B(E2)↑=54 e^{2}fm^4 26. Also reported a 1240 keV *11* γ ray, for which the measured cross section is 26 mb *6*.

2007No13: ^{28}Na production cross section ~0.01 μb is measured in ^{40}Ar fragmentation via ^{9}Be(^{40}Ar,X), E=90 MeV/nucleon, and ^{181}Ta(^{40}Ar,X), E=94 MeV/nucleon, reactions.

2006Kh08: ^{28}Na beam, E= 53.89 MeV/nucleon and 47.10 MeV/nucleon, bombarded a Si target, measured σ=2329 mb *45* and σ=2274 mb *22*, respectively, for the Si(^{28}Na,X) reaction and a squared reduced absorption radius of r_0^2=1.210 fm^2 *10* is deduced and used to study the isospin dependence.

^{28}Na Levels

Cross Reference (XREF) Flags

- A ^{28}Ne β^- decay
- B ^{29}Ne β^-n decay
- C Coulomb excitation

E(level)†	J$^\pi$‡	$T_{1/2}$	XREF	Comments
0.0	1$^+$	30.5 ms *4*	ABC	%β^-=100; %β^-n=0.58 *12* μ=+2.420 *2*; Q=+0.0395 *12* Charge radius <r^2>$^{1/2}$=3.04 fm *6* (2004An14). Matter radius <r^2>$^{1/2}$=3.01 fm *2* and 3.03 fm *3* (1998Su07). J$^\pi$: J=1 from Laser spectroscopy (1978Hu12), parity '+' from ^{28}Ne β^- decay feeding this state, log *ft*=4.2. $T_{1/2}$: from 1974Ro31. %β^-n from 1974Ro31. μ: From β^-NMR in 2000Ke09. Other: +2.426 μ_N *5* (atomic beam spectroscopy-1978Hu12); same value in 1989Ra17 and 2011StZZ (compilation). Q: From β^-NMR in 2000Ke09. Other: −0.02 b *4* (atomic beam spectroscopy-1982To05) − recalculated value=−0.004 b *31* in 2000Ke09 − using the revised reference of ^{23}Na. Also in 2011StZZ.
55.2 *5*			AB	
1131.2 *7*			AB	

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Adopted Levels, Gammas (continued)

^{28}Na Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
1254.2 *6*	(2$^+$)	2 ps *1*	A C	Jπ: Proposed in 2002Pr12 (Coulomb Excitation), from systematics of $^{26,+28}$Ne and $^{28,+30}$Mg, as the first rotational excitation (with J = 2) of a K = 1 rotational band via an *E2*. $T_{1/2}$: From Coulomb excitation, using B(E2)↑=0.0054 *26*, adopted γ-ray properties, and assuming a mixing ratio of 1.
1932.2 *7*	(1$^+$)[#]		A	Jπ: From log *ft*=5.3.
2118.4 *5*	(1$^+$)		A	
2714.3 *6*	(1$^+$)		A	
3286.4 *12*	(1$^+$)[#]		A	Jπ: From log *ft*=5.2.
3512.5 *12*	(1$^+$)[#]		A	Jπ: From log *ft*=5.3.

[†] From a least-squares fit to γ-ray energies, ΔE_γ=1 keV is assumed by the evaluator where uncertainty not given.
[‡] From ^{28}Ne β^- decay feeding assigned in 2006Tr02, except otherwise noted.
[#] Assigned by the evaluator from log *ft* values.

γ(^{28}Na)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Comments
55.2		55	100	0.0	1$^+$	
1131.2		1076	100 *14*	55.2		
		1131	91 *13*	0.0	1$^+$	
1254.2	(2$^+$)	1200	38 *6*	55.2		
		1255	100 *9*	0.0	1$^+$	E_γ: Other: 1240 keV *11* (Coulomb Excitation – 2002Pr12).
1932.2	(1$^+$)	1877	100 *17*	55.2		
		1932	88 *14*	0.0	1$^+$	
2118.4	(1$^+$)	864.5 *4*	28.2 *25*	1254.2	(2$^+$)	
		2062.9 *3*	100 *7*	55.2		
		2118	8.6 *15*	0.0	1$^+$	
2714.3	(1$^+$)	596	55 *7*	2118.4	(1$^+$)	
		782	71 *9*	1932.2	(1$^+$)	
		1583	100 *13*	1131.2		
		2659	55 *11*	55.2		
		2714	81 *13*	0.0	1$^+$	
3286.4	(1$^+$)	3231	100	55.2		
3512.5	(1$^+$)	3457	100	55.2		

[†] From ^{28}Ne β^- decay.

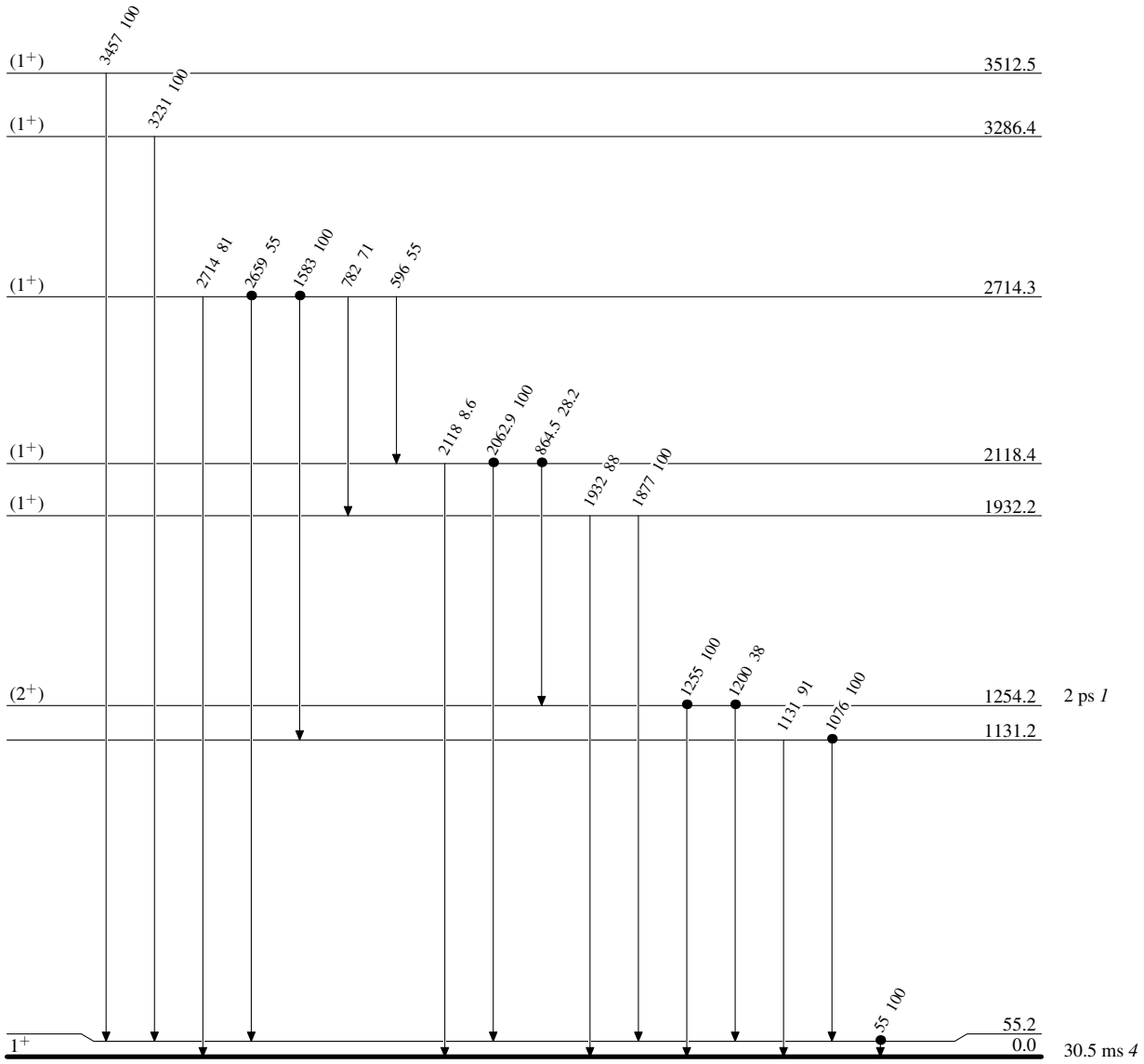
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

● Coincidence



$^{28}_{11}Na_{17}$