

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh		NDS 112,1393 (2011)	31-Mar-2011

$Q(\beta^-)=1.90\times 10^4$ syst; $S(n)=2.9\times 10^3$ syst; $S(p)=2.03\times 10^4$ syst; $Q(\alpha)=-1.81\times 10^4$ syst 2012Wa38

Note: Current evaluation has used the following Q record 1.994E4 88 2.25E3 94 19680 syst -17830 syst 2009AuZZ.

$Q(\beta^-)$: 18683 331 from measured (also evaluated) mass excess of 23630 330 (2007Ju03) for ^{33}Na and measured (also evaluated) mass excess of 4947 22 (2006Ga04,2006Lu09) for ^{33}Mg . 2003Au03 gives 20000 880.

Uncertainty: $\Delta S(p)=1190$, $\Delta Q(\alpha)=1050$ (2009AuZZ,2003Au03).

$Q(\beta^-n)=17770$ 880 (2009AuZZ,2003Au03).

1972K104: first identification and production of ^{32}Na nuclide in U(p,X) reaction at E=24 GeV, CERN-ISOLDE facility. Measured isotopic half-life. Later publications from the same laboratory dealing with spectroscopic measurements: 1978De39, 1984Gu19.

Other papers for production and cross section data: 1979We10, 1991Or01, 1997Ha11, 1998NoZW (also 1998NoZZ,1999YoZW), 2002Ra16 (also 2004Co29).

Mass measurements: 2007Ju03, 1991Or01.

Measurement of mean square radii using ^{33}Na beam: 2006Kh08.

Additional information 1.

^{33}Ne is particle unstable thus does not decay by β^- to ^{33}Na . ^{34}Ne possibly decays by delayed-neutron decay to ^{33}Na but no details are known about this mode. The ^{35}Ne nuclide which could possibly decay by delayed-two neutron decay to ^{33}Na has not been identified.

This nuclide is of possible relevance to "island of inversion" near N=20.

 ^{33}Na LevelsCross Reference (XREF) Flags

A $^{12}\text{C}(^{34}\text{Na},^{33}\text{Na}\gamma)$
 B $^9\text{Be}(^{38}\text{Si},^{33}\text{Na}\gamma)$

E(level) [†]	J ^π	T _{1/2}	XREF	Comments
0 [‡]	(3/2 ⁺)	8.0 ms 4	AB	$\% \beta^- = 100$; $\% \beta^- n = 47$ 6 (2002Ra16); $\% \beta^- 2n = 13$ 3 (2002Ra16) Others: $\% \beta^- n = 52$ 20, $\% \beta^- 2n = 12$ 5 (1984Gu19). T _{1/2} : average value as adopted by 2002Ra16 from their measurements: 7.9 ms 4 (β timing), 8.0 ms 7 (neutron timing) and 8.1 ms 4 (γ timing). Others: 20 ms 15 (1972K104), 8.2 ms 4 (1984Gu19), 8.5 ms 4 (1998NoZW). J ^π : systematics of odd Na nuclides and possible β feeding of (3/2 ⁺) g.s. of ^{33}Mg (2010Do05,2004Co29,2002Ra16,2003Au02); comparison with shell-model calculations, which predict 3/2 ⁺ for g.s. and 5/2 ⁺ for almost a degenerate state at 59 keV (2010Do05); 3/2 ⁺ predicted by Monte-Carlo shell-model and conventional shell-model calculations in 2011GaZZ. Mean square radius=1.42 fm ² 14 (2006Kh08) in Si(^{33}Na ,X) reaction at E=33.79 and 38.79 MeV/nucleon, also measured energy- integrated cross sections.
429 [‡] 5	(5/2 ⁺)		AB	J ^π : systematics of odd-A Na nuclides; 5/2 ⁺ from shell-model predictions in 2011GaZZ.
1117 [‡] 8	(7/2 ⁺)		B	J ^π : shell model predictions in 2011GaZZ. For a possible 1117-keV transition to the g.s. branching ratio is calculated as 4.2% (2011GaZZ), too weak to be seen in the work of 2011GaZZ.

[†] From E_γ data.

[‡] Possible member of KΠ=(3/2⁺) rotational band as predicted in shell model calculations (2011GaZZ).

Adopted Levels, Gammas (continued) $\gamma({}^{33}\text{Na})$

$E_i(\text{level})$	J_i^π	E_γ^\dagger	E_f	J_f^π	Comments
429	(5/2 ⁺)	429 5	0	(3/2 ⁺)	E_γ : 467 13 in ${}^{12}\text{C}({}^{34}\text{Na}, {}^{33}\text{Na}\gamma)$.
1117	(7/2 ⁺)	688 6	429	(5/2 ⁺)	

[†] From ${}^9\text{Be}({}^{38}\text{Si}, {}^{33}\text{Na}\gamma)$.

Adopted Levels, GammasLevel Scheme