^{33}Na β^-2n decay (8.0 ms) 2001Nu02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 184, 29 (2022)	24-Jun-2022

Parent: ^{33}Na: E=0.0; J$^\pi$=(3/2$^+$); $T_{1/2}$=8.0 ms *4*; Q(β^-2n)=10.76×10^3 *45*; %β^-2n decay=13 *3*

^{33}Na-J$^\pi$,$T_{1/2}$: From Adopted Levels of ^{33}Na in the ENSDF database (2011Ch49) (March 2011 update).

^{33}Na-Q(β^-2n): 10762 *450* deduced by evaluators from Q(β^-)=18820 *450* for ^{33}Na and S(2n)=8058 *4* for ^{33}Mg given in 2021Wa16.

^{33}Na-%β^-2n decay: %β^-n=47 *6* and %β^-2n=13 *3*, deduced from P(1n)/P(2n)=3.6 *9* and P(1n)+P(2n)=73 *6* (2001Nu02,2002Ra16). Other: %β^-n=52 *20*, %β^-2n=12 *5* (1984Gu19); %β^-n+%β^-2n=77 *15* (1984La03).

2001Nu02: ^{33}Na was produced by bombarding 46 g/cm^2 Uranium Carbide with 1.4 GeV protons from the PS/Booster at CERN and separated by the ISOLDE facility. γ rays were detected with two Ge detectors, β particles were detected with a thin plastic scintillator, and neutrons were detected by a neutron detector. Measured Eγ, Iγ, $\gamma\gamma$-coin, nγ-coin, $\beta\gamma\gamma$-coin, $\beta\gamma$-n-coin, $\beta\gamma$-coin. Deduced levels, %β^-n and %β^-2n. 2002Ra16 also report %β^-n and %β^-2n and is from the same group as 2001Nu02.

1984Gu19: ^{33}Na from Ir(p,X) E(p)=10 GeV at CERN. Measured Eγ, Iγ. Deduced %β^-n and %β^-2n.

^{31}Mg Levels

E(level)†	J$^\pi$‡	$T_{1/2}$‡
0.0	1/2$^+$	270 ms *2*
50.5 *2*	3/2$^+$	12.0 ns *4*
221.05 *9*	(3/2)$^-$	133 ps *8*

† From Eγ data.
‡ From Adopted Levels.

γ(^{31}Mg)

Iγ normalization: using the factor 0.22 *8* given by 2001Nu02 for converting their Iγ values relative to I(885γ)=100 in ^{32}Mg to intensities per 100 decays of ^{33}Na nuclei, and %β^-2n=13 *3*.

E$_\gamma$‡	I$_\gamma$‡#	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.	α†	Comments
50.1 *2*	8.2 *9*	50.5	3/2$^+$	0.0	1/2$^+$	[M1]	0.01312 *23*	%Iγ=1.8 *7* α(K)=0.01228 *21*; α(L)=0.000803 *14*; α(M)=2.93×10^{-5} *5*
171.2 *1*	3.5 *4*	221.05	(3/2)$^-$	50.5	3/2$^+$	[E1]	1.04×10^{-3} *2*	%Iγ=0.77 *29* α(K)=0.000972 *14*; α(L)=6.24×10^{-5} *9*; α(M)=2.299×10^{-6} *32*
221.0 *1*	1.4 *2*	221.05	(3/2)$^-$	0.0	1/2$^+$	[E1]	0.000465 *7*	%Iγ=0.31 *12* α=0.000465 *7*; α(K)=0.000436 *6*; α(L)=2.80×10^{-5} *4*; α(M)=1.032×10^{-6} *15*

† Additional information 1.
‡ From 2001Nu02. Intensities are relative to 100 for the 885γ in ^{32}Mg.
# For absolute intensity per 100 decays, multiply by 0.22 *8*.

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Decay Scheme