Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	R. B. Firestone	NDS 127, 1 (2015)	15-Jan-2015

Q(β^-)=1.719×10^4 *10*; S(n)=4.59×10^3 *11*; S(p)=1.960×10^4 *26*; Q(α)=−2.094×10^4 *20* 2012Wa38

1970Ar09: first identification of ^{21}N in ^{232}Th(^{22}Ne,X) reaction at E=174 MeV, measured yield.

1990Mu06: ^{21}N produced in ^{181}Ta(^{48}Ca,X), E=2110 MeV at GANIL, measured half-life of ^{21}N and β-delayed neutron emission probability.

1991Re02,1995ReZZ: ^{21}N produced in ^{232}Th(p,X), E=800 MeV, LAMPF, TOFI spectrometer, measured half-life of ^{21}N and β-delayed neutron emission probability.

2000Sa47,2004Sa14: C(^{21}N,^{20}N) E=43 MeV/nucleon; ^{21}N beam from C(^{40}Ar,X), E=70 MeV/nucleon. GANIL coupled cyclotron facility, SPEG spectrometer. Measured one-neutron removal cross sections, Glauber-model analysis; deduced spin and parity of ^{21}N$_{g.s.}$.

2001Oz03: C(^{21}N,X) E=1005 MeV/nucleon; ^{21}N beam from fragmentation of ^{40}Ar beam at 1 GeV/nucleon with ^{9}Be and ^{181}Ta targets. GSI, FRS facility. Measured interaction cross section and deduced matter radius.

2006Kh08: Si(^{21}N,X) E=34.20, 39.15, MeV/nucleon; ^{21}N beam from fragmentation of ^{48}Ca beam at 60.3 MeV/nucleon with ^{181}Ta target. GANIL, SPEG facility. Measured cross sections and deduced r_0^2.

2009Li51 (also 2008Lo06): ^{21}N beam produced in the reaction ^{9}Be(^{26}Mg,X), E=68.8 MeV/nucleon at RIBLL, HIRFL facility in Lanzhou. The ^{21}N fragments were separated and stopped in an implantation detector. Energy loss and time-of-flight information used to identify incoming particles. Measured neutrons, β, γ-rays in singles and coincidence (βn, $\beta\gamma$, $\beta\gamma$n) modes using neutron wall and neutron ball for neutrons, NE102 plastic scintillators for β particles and four segmented Clover HPGe detectors for γ-rays.

Populated by ^{22}C β-n (one-neutron) decay (2003Yo02), $T_{1/2}$=6.1 ms *+14−12*; *%β^-*1n=61 *+14−13*. No ^{21}N level data available in this decay.

Additional information 1.

^{21}N Levels

Cross Reference (XREF) Flags

- A ^{22}C β^-n decay (6.1 ms)
- B ^{9}Be(^{36}S,Xγ)
- C ^{1}H(^{21}N,^{21}N′γ)

E(level)	J$^\pi$ †	$T_{1/2}$	XREF	Comments
0.0	(1/2$^-$)	84 ms *7*	A	*%β^-*=100; *%β^-*n=86 *4* $T_{1/2}$: Weighted average of 83 ms *8* (2009Li51), which replaced their earlier result of 82.9 ms *19* (2008Lo06), 95 ms *+15−11* (1990Mu06) 61 ms *23* (1991Re02), 83.6 ms *67* (1995ReZZ,1991Re02). *%β^-*n: Weighted average of 90.5 *42* (2009Li51), 84 *9* (1990Mu06), 76 *15* (1991Re02,1995ReZZ), and 78 *7* (1995ReZZ). *%β^-*2n: β-delayed two-neutron emission is energetically possible. A search for the 1356γ in ^{19}F proved negative (2009Li51). J$^\pi$: From comparison of one-neutron removal cross sections to extended Glauber model calculations, weighted by shell model spectroscopic factors (2004Sa14,2000Sa47). Measured one-neutron removal cross section=140 mb *44* (2004Sa14) in C(^{21}N,^{20}N) reaction at 43 MeV/nucleon. Measured interaction σ=1114 mb *9* (2001Oz03) in C(^{21}N,X) at E=1005 MeV/nucleon. Deduced matter radius=2.75 fm *3* (2001Oz03). Measured σ=2.12 b *7* at 34.20 MeV/nucleon and 2.16 b *3* at 39.15 MeV/nucleon in Si(^{21}N,X) reaction (2006Kh08); deduced strong absorption r_0^2=1.231 fm^2 *15* (2006Kh08). E(level): Least-squares fit to γ-rays from 2008So09 and 2010El05.
1160 *30*	(3/2$^-$)		ABC	Configuration=$\pi p_{1/2}^{-1}\otimes$(first 2$^+$ in ^{22}O).
2380 *50*	(5/2$^-$)		A C	Configuration=$\pi p_{1/2}^{-1}\otimes$(first 2$^+$ in ^{22}O).

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Adopted Levels, Gammas (continued)

^{21}N Levels (continued)

E(level)	J^{π}[†]	XREF	Comments
3300 *50*	$(5/2^-)$	B	Configuration=$\pi p^{-1}_{1/2}\otimes(3^+$ neutron excitation).
3600 *50*	$(5/2^+)$	B	E(level): Possible intruder state.
4170 *50*	$(7/2^-)$	B	Configuration=$\pi p^{-1}_{1/2}\otimes(3^+$ neutron excitation).

[†] From comparison with shell-model calculations and decay pattern.

$\gamma(^{21}N)$

E_i(level)	J^{π}_i	E_γ	I_γ	E_f	J^{π}_f
1160	$(3/2^-)$	1159 *29*	100	0.0	$(1/2^-)$
2380	$(5/2^-)$	1220 *29*	100 *35*	1160	$(3/2^-)$
		2405[‡]		0.0	$(1/2^-)$
3300	$(5/2^-)$	884[†‡] *27*		2380	$(5/2^-)$
		2142 *33*	100 *21*	1160	$(3/2^-)$
3600	$(5/2^+)$	1210[‡]		2380	$(5/2^-)$
		2438 *33*	100 *33*	1160	$(3/2^-)$
4170	$(7/2^-)$	884[†‡] *27*		3300	$(5/2^-)$
		1790 *28*	100 *25*	2380	$(5/2^-)$

[†] Multiply placed.
[‡] Placement of transition in the level scheme is uncertain.

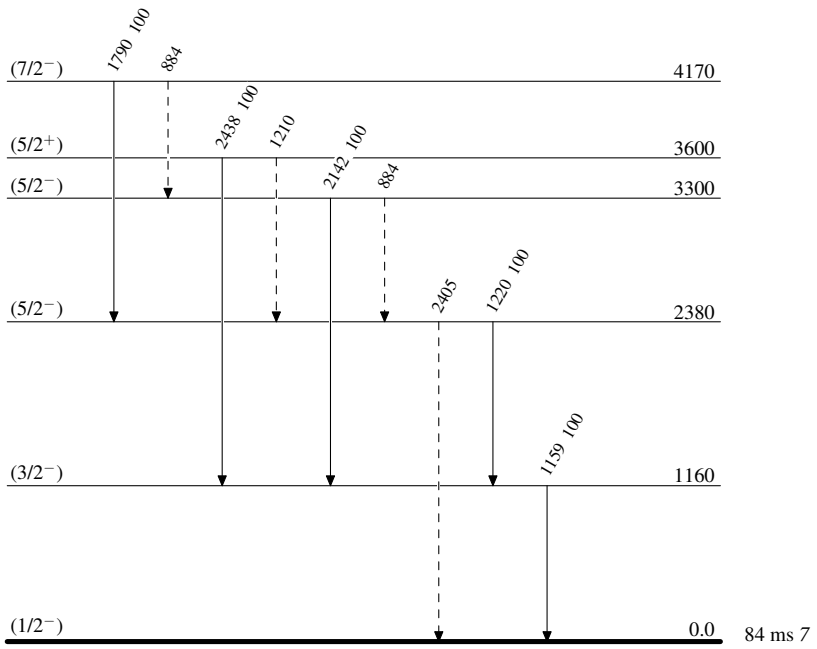
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{21}_{7}N_{14}$