Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	R. Spitzer, J. H. Kelley	ENSDF	30-Jun-2021

Q(β^-)=13896 *19*; S(n)=2828 *24*; S(p)=15208 *25* 2021Wa16
Prior reviews: 1972Aj02, 1978Aj05, 1983Aj01, 1987Aj02, 1995Ti07.

Shell Model analysis of ^{18}N:
The ground state spin of ^{18}N is $J^\pi=1^-$ (1982Ol01) while a simple shell-model analysis predicts $J^\pi=2^-$. Detailed discussion is given (1983Sh44, 1984Ba24, 2012Yu07, 2018Ji07).

See other relevant theoretical analysis in:
1988PoZS, 1993Pa14, 1993Po11, 1997Ba54, 2000Zh42, 2004La24, 2004Ne16, 2004Su23, 2005Fo13, 2006Ko02, 2016Ma06, 2018Fo04, 2018Fo17, 2019Fo08.

Other relevant reaction studies:
1981SuZS, 1987Su06: Systematic measurement of μ^- capture rates.
1983As01, 1984As05: ^{18}O(π^-,π^0). Studied isospin dependence of single-charge-exchange reactions for ($\pi^\pm$,π^0) reactions at LAMPF. See also (1980Ge09, 1982ArZT).
1998Mu17: Theoretical analysis on μ capture rates on light nuclei.
1999He33: Theoretical analysis of astrophysically relevant neutron capture in unstable nitrogen nuclei.
2019Zh29: Calculated μ^- spalation yields on Ar leading to ^{18}N, which is a source of background in the DUNE neutrino detector.

^{18}N Levels

Cross Reference (XREF) Flags

A	^{18}C β^- decay	J	^{9}Be(^{40}Ar,^{18}N)	S	^{18}O(^{11}B,^{11}C)
B	^{19}C β^-n decay	K	^{12}C(^{22}Ne,^{18}N)	T	^{18}O(^{18}O,^{18}N)
C	^{2}H(^{17}N,P)	L	^{14}C(^{7}Li,^{3}He)	U	^{28}Si(P,^{18}N):spallation
D	^{9}Be(^{11}B,2pγ)	M	^{14}C(^{18}O,^{18}N)	V	^{181}Ta(^{18}O,^{18}Nγ)
E	^{12}C(^{18}N,X)	N	^{18}O(π^-,γ)	W	^{181}Ta(^{22}Ne,^{18}N)
F	^{9}Be(^{18}O,P2A)	O	^{18}O(n,p)	X	^{232}Th(P,^{18}N)
G	^{9}Be(^{18}O,^{18}N):moment	P	^{18}O(d,^{2}He)	Y	^{232}Th(^{18}O,^{18}N),(^{22}Ne,^{18}N)
H	^{9}Be(^{19}N,^{18}N)	Q	^{18}O(t,^{3}He)		
I	^{9}Be(^{22}Ne,^{18}N)	R	^{18}O(^{7}Li,^{7}Be)		

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0	1^-	619 ms *2*	AB DEFGHIJKLMNOPQR TUVWXY	%β^-=100; %$\beta^-\alpha$=12.2 *6* (1989Zh04); %β^-n=12.0 *13* (1994ReZZ) T=2 μ=0.3273 *4* (2009De34) Q=0.0123 *12* (1999Og03) J^π: From ^{18}N β^- decay to $^{18}O_{g.s.}$ (1982Ol01). $T_{1/2}$: From (2005Li60), See also 620 ms *8* (2007Bu01), 625 ms *30*, 635 ms *40* and 609 ms *60* (2007Lo05), 620 ms *14* (1999Og03), 0.63 s *2* (1994Sc01), 658 ms *44* (1994ReZZ), 624 ms *12* (1982Ol01) and 0.63 s *3* (1964Ch19). μ: From β-NMR (2009De34) and (2019StZV). See also μ=0.3279 *13* (1998Og04) and (−)0.135 *15* (1999Ne01). Q: From (1999Og03) and (Priv. comm. Nick Stone (2021)). This is an update of (2014StZZ). See also +0.027 *4* (1999Ne01). See

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{18}N Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF	Comments
				other discussion in (2003Um02).
114.71† *10*	(2^-)‡	0.40 ns *11*	ABCD H P R V	%IT=100 $T_{1/2}$: From (2008Wi05).
587.39† *20*	(2^-)‡		AB D H LM ST V	%IT=100
742.0† *4*	(3^-)‡		CD H L R V	%IT=100
1170 *20*	(1^-)		C N	%IT=100 E(level),J^π: From ^{2}H(^{17}N,p) (2013Ho21).
1734.75† *19*	(1,2)#		A	%IT=100 J^π: From ^{18}C β^- decay (1991Pr03).
2210			C R	%IT=100
2405.0† *9*		0.11 ps *+51−7*	R V	%IT=100 $T_{1/2}$: From τ=0.16$^{+74}_{-10}$ ps and E_γ=1663.0 keV *8* (2020Zi03).
2614.35† *21*	1^+#		A	%IT=100 J^π: From ^{18}C β^- decay (1991Pr03).
2.9×10^3? *2*			N	E(level): From ^{18}O(π^-,γ).
6.9×10^3? *2*			N	E(level): From ^{18}O(π^-,γ).
8.5×10^3? *2*			N	E(level): From ^{18}O(π^-,γ).
10.1×10^3? *2*			N	E(level): From ^{18}O(π^-,γ).

† From least squares fit to (E_x: E_γ), (115: 114.7 *1*), (587: 472.7 *2*), (742: 154.6 *3*, 627 *1*), (1735: 1147.8 *4*, 1619.9 *3*, 1734.8 *4*), (2405: 1663.0 *8*), (2614: 879.7 *2*, 2025.3 *8*, 2499.3 *4*, 2614.2 *4*) from averages of γ energies given in ^{18}C β^- (1991Pr03), ^{9}Be(^{11}B,2pγ) (2008Wi05) and ^{181}Ta(^{18}O,^{18}Nγ) (2020Zi03).

‡ Suggested by theory (1984Ba24). See also (1982Ol01,1991Pr03).

See (1993Ch06).

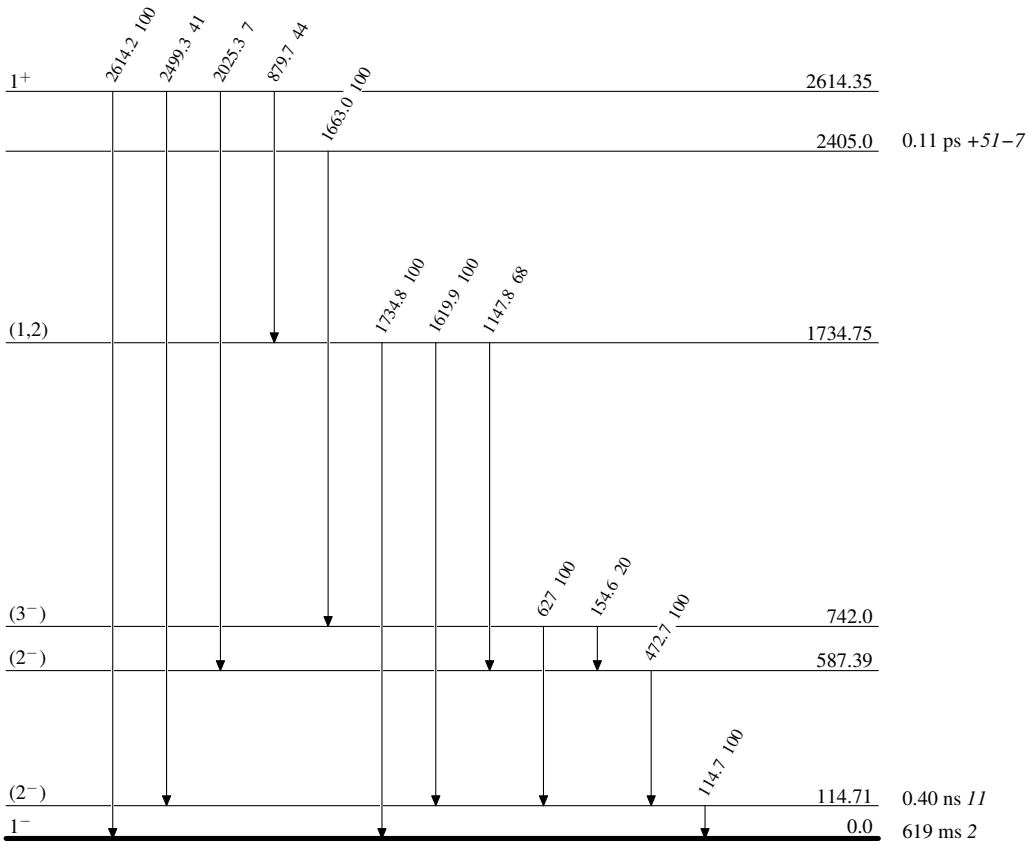
γ(^{18}N)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Comments
114.71	(2^-)	114.7 *1*	100	0.0	1^-	B(M1)(W.u.)=0.036 *10*
587.39	(2^-)	472.7 *2*	100 *16*	114.71	(2^-)	
742.0	(3^-)	154.6 *3*	20	587.39	(2^-)	
		627 *1*	100	114.71	(2^-)	I_γ: From (2008Wi05).
1734.75	(1,2)	1147.8 *4*	68 *20*	587.39	(2^-)	
		1619.9 *3*	100 *25*	114.71	(2^-)	
		1734.8 *4*	100 *25*	0.0	1^-	I_γ: A discrepancy exists between the (1991Pr03) Table 1 and Table 3 γ-ray intensities for E_x=1734 keV; we use values from Table 1. This choice is necessary to reproduce their relative β^- feedings to ^{18}N*(1734,2614).
2405.0		1663.0 *8*	100	742.0	(3^-)	I_γ: From (2020Zi03).
2614.35	1^+	879.7 *2*	44 *4*	1734.75	(1,2)	
		2025.3 *8*	7 *5*	587.39	(2^-)	
		2499.3 *4*	41 *9*	114.71	(2^-)	
		2614.2 *4*	100 *11*	0.0	1^-	

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{18}_{7}N_{11}$