Adopted Levels, Gammas 2004Ti06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, C. G. Sheu, J. L. Godwin, et al.	NP A745 155 (2004)	31-Mar-2004

Q(β^-)=−16494.5 *24*; S(n)=18576.4 *14*; S(p)=−185.9 *9*; Q(α)=−1.69×10^3 *5* 2012Wa38
Note: Current evaluation has used the following Q record −16494.8 2318577.1 *14*−185.6 *10*−1689 50 2003Au03.
See other reaction references in (1988Aj01).

^{9}B Levels

Cross Reference (XREF) Flags

A	^{9}C β^+ decay	G	^{7}Be(d,n),^{7}Be(d,p)	M	^{10}B(^{3}He,α),(^{3}He,αp),(^{3}He,2α)
B	^{6}Li(^{3}He,γ),(^{3}He,n),(^{3}He,p)	H	^{9}Be(p,n),^{9}Be(p,pn)	N	^{11}B(p,t)
C	^{6}Li(^{3}He,d),(^{3}He,t),(^{3}He,^{3}He)	I	^{9}Be(^{3}He,t)	O	^{12}C(p,α),^{12}C(p,pt)
D	^{6}Li(α,n)	J	^{9}Be(^{6}Li,^{6}He),^{9}Be(^{7}Li,^{7}Be)	P	^{12}C(t,^{6}He),^{12}C(^{3}He,^{6}Li)
E	^{6}Li(^{6}Li,t)	K	^{10}B(p,d),^{10}B(p,np)		
F	^{7}Li(^{3}He,n),(^{3}He,nγ)	L	^{10}B(d,t)		

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0	3/2⁻	0.54 keV *21*	AB DEF HIJKLMNOP	%p=100 T=1/2
≈1500?		≈1.2 MeV	E HIJ M O	%p<100; %α>0 E(level): E=1.48 MeV *2* is the weighted average of values reported in ^{6}Li(^{6}Li,t) 1600 keV *100*, ^{9}Be(^{3}He,t) 1490 keV *20*, ^{9}Be(^{6}Li,^{6}He) 1320 keV *80*, ^{10}B(^{3}He,p) 1800 keV *300*, ^{12}C(p,α) 1510 keV *50*. Γ: Γ=1.20 MeV *5* is the weighted average of values reported in ^{9}Be(^{3}He,t) 1280 keV *50*, ^{9}Be(^{6}Li,^{6}He) 860 keV *260*, ^{10}B(^{3}He,p) 900 keV *300*.
2345 *11*	5/2⁻	81 keV *5*	AB D F HIJKLMNOP	%α=99.5; %p=0.5 T=1/2 E(level): two measurements dominate the weighted average. E=2326 keV *6* from ^{9}Be(p,n) (1955Ma84) and 2361 keV *5* from ^{10}B(^{3}He,α) (1968Ma84). However the values are not in agreement. The uncertainty has been enlarged by the evaluator. Other values used in the weighted average are 2340 keV *30* from ^{9}C β-decay, 2320 keV *30* from ^{9}Be(^{3}He,t), 2340 keV *20* from ^{10}B(p,d), and 2320 keV *40* from ^{11}B(p,t). See ^{10}B(^{3}He,α) for other values. Γ: From ^{10}B(^{3}He,α) (1968Kr02). Decay branching ratios from (2000Ge09).
2751 *25*	5/2⁺	614 keV *37*	EF HIJK M OP	%p≈100 T=1/2 E(level): from weighted average of 2.71 MeV *10* ^{9}Be(p,n), 2720 keV *40* ^{9}Be(^{3}He,t), 2788 keV *30*, 2710 keV *30* and 2830 keV *30* from ^{10}B(^{3}He,α) and 2.9 MeV *2* ^{12}C(p,α). Γ: From weighted average of 0.7 MeV *1* ^{9}Be(p,n) and 600 keV *40* ^{10}B(^{3}He,α). %p from (1966Wi08). Note: the order of the J^π=5/2⁺ and 1/2⁻ levels is inverted when compared with (2004Ti06). In the case of the 5/2⁺ level, the present evaluator determined the level energy from a weighted average. In (2004Ti06) the energy 2788 keV *30* was taken from a single measurement in ^{10}B(^{3}He,α) (1968Kr02).

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Adopted Levels, Gammas 2004Ti06 (continued)

^{9}B Levels (continued)

E(level)	Jπ	$T_{1/2}$	XREF	Comments
				%p≈100 T=1/2 E(level): from weighted average of 2.71 MeV *10* ^{9}Be(p,n), 2720 keV *40* ^{9}Be(^{3}He,t), 2788 keV *30*, 2710 keV *30* and 2830 keV *30* from ^{10}B(^{3}He,α) and 2.9 MeV *2* ^{12}C(p,α). Γ: From weighted average of 0.7 MeV *1* ^{9}Be(p,n) and 600 keV *40* ^{10}B(^{3}He,α). %p from (1966Wi08). Note: the order of the J^{π}=5/2^{+} and 1/2^{-} levels is inverted when compared with (2004Ti06). In the case of the 5/2^{+} level, the present evaluator determined the level energy from a weighted average. In (2004Ti06) the energy 2788 keV *30* was taken from a single measurement in ^{10}B(^{3}He,α) (1968Kr02).
2.78×10^{3} *16*	1/2^{-}	3.13 MeV *20*	A E H	%p≥90; %α≤10 E(level): from weighted average of 2.75 MeV *30* ^{9}Be(p,n) and 2.8 MeV *2* from ^{9}C β-decay. Other value 2.91 MeV from ^{6}Li(^{6}Li,t). This level is thought to Be the analog to ^{9}Be(2.78); see (1988Mi03). Γ: From ^{9}Be(p,n). Other values 2.5 MeV from ^{9}C β-decay and 3.03 MeV from ^{6}Li(^{6}Li,t). J^{π} from ^{9}C β-decay and ^{6}Li(^{6}Li,t). Note: the order of the J^{π}=5/2^{+} and 1/2^{-} levels is inverted when compared with (2004Ti06). In the case of the 1/2^{-} level, the present evaluator determined the level energy from a weighted average. In (2004Ti06) the energy 2.75 MeV *30* was taken from a single measurement in ^{9}Be(p,n). %p from (2000Ge09), particle-decay following ^{9}C β-decay.
4.8×10^{3} *1*		1.2 MeV *2*	F HIJ M	%α≤100 E(level): from weighted average of 4.8 MeV *1* ^{7}Li(^{3}He,n), 4800 keV *30* ^{9}Be(^{3}He,t), 4.60 MeV *16* ^{9}Be(^{6}Li,^{6}He) and 4.9 MeV *2* ^{10}B(^{3}He,α). A level at E=4.3 MeV *2* with Γ=1.6 MeV *2* from the unpublished thesis work of pugh ^{9}Be(p,n) is referenced in (1988Mi03 and 1991Di03) and was adopted in (2004Ti02). Γ: From weighted average of 1.0 MeV *2* ^{7}Li(^{3}He,n) 1.5 MeV *3* ^{9}Be(^{3}He,t), 0.68 MeV *43* ^{9}Be(^{6}Li,^{6}He), and 1.5 MeV *3* ^{10}B(^{3}He,α).
6985 *50*	7/2^{-}	2.18 MeV *15*	F HI K NOP	%p≤100 T=1/2 E(level): from weighted average of 7.0 MeV *1* from ^{9}Be(p,n), 7.1 MeV *2* from ^{10}B(p,d) and 6970 keV *60* from ^{12}C(p,α). Γ: From ^{10}B(p,d).
11640 *50*	(7/2)$^{-}$	780 keV *45*	H K M OP	%p≤100 T=1/2 E(level): from weighted average of 11.63 MeV *20* from ^{9}Be(p,n), 11.68 MeV *7* from ^{10}B(p,d), 11.62 MeV *10* from ^{10}B(^{3}He,α), 11.46 MeV *20* from ^{12}C(p,α). Γ: From weighted average of 800 keV *50* ^{10}B(p,d), and 0.7 MeV *1* ^{10}B(^{3}He,α).
12160 *40*		455 keV *20*	A F H N	%p=24 *4*; %α=74 *10* T=1/2 E(level): from weighted average of 12060 keV *60* from

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Adopted Levels, Gammas 2004Ti06 (continued)

^{9}B Levels (continued)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
				^{7}Li(^{3}He,n), 12190 keV *40* from ^{9}C β-decay, 12160 keV *100* from ^{9}C β-decay and 12230 keV *100* from ^{9}Be(p,n). The uncertainty is enlarged by the evaluator. Γ: From weighted average of 800 keV *200* from ^{7}Li(^{3}He,n), 12190 keV *40* from ^{9}C β-decay, 450 keV *20* from ^{9}C β-decay, and 500 keV *100* from ^{9}Be(p,n). Branching ratios from (2000Ge09). See also (2001Be51) who report %p=33 *10* and %α=66 *8*..
14010 *70*		0.39 MeV *11*	A F H N	%p=100 T=1/2 E(level): from ^{7}He(^{3}He,n). Also see 13.96 MeV *10* from ^{9}Be(p,n) and 14.0 MeV *2* from ^{9}C β-decay. Γ: From ^{7}Li(^{3}He,n). Branching ratios from (2000Ge09).
14655.0 *25*	3/2$^-$	0.377 keV *38*	A F I N	%IT=4.09; %p≈44; %α≈46 T=3/2 E(level): from ^{11}B(p,t) (1974Ka15). See comments in ^{11}B(p,t). Γ: The Γ is not directly measured, it is deduced from a measurement of $\Gamma_{\gamma0}/\Gamma$=0.0185 *15* (1978Di08) and an assumption that the B(M1) strength is identical to that for the isobaric analog state (assuming ^{9}Be(14392 keV), $\Gamma_{\gamma0}$=6.60 eV *40* and Γ=365 eV *29* (2004Ti06)). In previous publications, less reasonable assumptions were applied; see (1971Ad01 and 1976Mc10). Branching ratios from ^{7}Li(^{3}He,N+γ) (1978Di08) (%IT), ^{7}Li(^{3}He,N+p) (1976Mc10) (%p) and ^{9}C β-decay (2001Be51) (%α).
14.70×10^3 † *18*	(5/2)$^-$	1.35 MeV *20*	K	T=1/2 E(level): Γ: from ^{10}B(p,d).
15290 † *40*			N	T=1/2 E(level): from ^{11}B(p,t): see also unpublished work in ^{9}Be(p,n).
15580 † *40*			N	T=1/2 E(level): from ^{11}B(p,t): see also unpublished work in ^{9}Be(p,n).
16024 † *25*		180 keV *16*	F N	T=(1/2) E(level): Γ: from ^{7}Li(^{3}He,n).
16.71×10^3?† *10*	(5/2$^+$)		H	E(level): from unpublished work on ^{9}Be(p,n). This level is thought to Be an analog to the ^{9}Be 5/2$^+$ state at 16.67 MeV (see 1991Di03).
17076 *4*		22 keV *5*	B I N	%IT>0; %^{3}He<100 T=3/2 E(level): Γ: from ^{11}B(p,t).
17190 *25*		113 keV *24*	C FG N	%p<100; %d>0; %^{3}He>0 E(level): from ^{7}Be(d,n). Γ: From weighted average of 110 keV *30* from ^{6}Li(^{3}He,d) and 120 keV *40* from ^{7}Be(d,n).
17.54×10^3?† *10*	(7/2$^+$)		H	E(level): from unpublished work on ^{9}Be(p,n). This level is thought to Be an analog to the ^{9}Be 7/2$^+$ state at 17.49 MeV (see 1991Di03).
17638 *10*		71 keV *7*	BC FG N	%p<100; %d>0; %^{3}He>0; %α>0

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Adopted Levels, Gammas 2004Ti06 (continued)

^{9}B Levels (continued)

E(level)	$T_{1/2}$	XREF	Comments
			E(level): from weighted average of 17640 keV *10* from ^{7}Be(d,n) (1960Ka17) and 17630 keV *20* from ^{6}Li(^{3}He,α) (1978Gu15). Γ: From weighted average of 71 keV *8* from ^{7}Be(d,n) (1960Ka17) and 70 keV *20* from ^{6}Li(^{3}He,α) (1978Gu15).
18.6×10^{3}? *3*	1000 keV	B I K	%p<100; %^{3}He>0 E(level): from ^{9}Be(^{3}He,t).
20.7×10^{3}?† *5*	1.6 MeV *3*	I	E(level): Γ: from ^{9}Be(^{3}He,t).

† Decay mode not specified.

$\gamma(^{9}B)$

E_i(level)	J^{π}_{i}	E_γ†	I_γ	E_f	J^{π}_{f}	Mult.	Comments
14655.0	3/2$^-$	11.87×10^{3} *16*	16.0 *93*	2.78×10^{3}	1/2$^-$	M1	Γ_γ=1.17 eV *70*; B(M1)(W.u.)=0.033 *20*
		12301 *11*	100 *11*	2345	5/2$^-$	M1	Γ_γ=7.3 eV *11*; B(M1)(W.u.)=0.186 *28*
		≈13145	<4.1	≈1500?		E1	Γ_γ<0.3 eV; B(E1)(W.u.)<4.5×10^{-4}
		14642.2 *25*	95.9 *88*	0.0	3/2$^-$	M1	Γ_γ=6.97 eV *42*; B(M1)(W.u.)=0.105 *6*
17076		14718 *11*		2345	5/2$^-$		
		17059 *4*		0.0	3/2$^-$		

† From level energy difference; recoil correction applied.

Adopted Levels, Gammas 2004Ti06

Level Scheme

Intensities: Type not specified