^{23}Na(^{3}He,d),(^{3}He,dγ) 1969An08,1978Ga19,2004Ha50

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

$J^{\pi}(^{23}Na)=3/2^{+}$.

Others: 1994Ve04, 1968Be40, 1973Tr05, 1960Hi13.

1969An08: ^{23}Na(^{3}He,dγ), E=8.9.10 MeV. Measured Eγ, DSA. Surface barrier, Ge(Li) detectors.

1978Ga19: ^{23}Na(^{3}He,d),E=15 MeV. Measured $\sigma(\theta)$, magnetic spectrograph. DWBA analysis, comparison with Nilsson model.

2004Ha50: E=20 MeV. Measured $\sigma(\theta)$ from 5° to 35° (lab); the deuterons were analyzed with a magnetic spectrograph and position sensitive avalanche detector. DWBA analysis. Spectroscopic factors deduced for states corresponding to resonances in the ^{23}Na(p,γ) and ^{23}Na(p,α) reactions.

1960Hi13: ^{23}Na(^{3}He,d): sodium bromide target; E_d=10.19 MeV; photographic plate; measured deuteron spectrum; deduced excited level energies with respect to 2nd excited state energy as 4121.5 keV *14*.

^{24}Mg Levels

E(level)[†]	J$^{\pi}$[@]	T$_{1/2}$[a]	L[b]	S(2J+1)[c]	Comments
0.0					
1368.5 *7*		1.2 ps *+7−4*	(0)+2	0.16,6.5 *4*	T$_{1/2}$: From τ=1.7 ps *+10−5* (1969An08). C^{2}S=0.94 for d$_{5/2}$ (1994Ve04).
4121.8 *12*		47 fs *17*	2	0.53	E(level): Other: 4122 (1960Hi13). T$_{1/2}$: From τ=68 fs *25* (1969An08).
4237.2 *13*		60 fs *21*	0+2	0.48,2.3	E(level): Other: 4232 *8* (1960Hi13). T$_{1/2}$: From τ=86 fs *30* (1969An08).
5235.3 *16*		66 fs *17*	2	1.90	E(level): Other: 5224 *8* (1960Hi13). T$_{1/2}$: From τ=95 fs *25* (1969An08). C^{2}S=0.30 for d$_{3/2}$ (1994Ve04).
6002.9 *16*		35 fs *17*	(2)	<0.15	E(level): Other: 6005 *8* (1960Hi13). T$_{1/2}$: From τ=50 fs *25* (1969An08).
7350[#] *8*			0+2	0.18,0.21	
7559 *5*			1	0.04	E(level): Other: 7561 *10* (1960Hi13).
7617 *3*					E(level): Other: 7620 *10* (1960Hi13).
7750 *3*			0+2	0.65,1.15	E(level): Other: 7746 *10* (1960Hi13).
7808[#] *10*					
8120[#] *10*					
8363 *3*			1	0.17	E(level): Other: 8357 *10* (1960Hi13). L: Other: 3+1 (1973Tr05). S(2J+1): Other: 0.06 *1* for 1f$_{7/2}$ and 0.012 *2* for 2p$_{3/2}$ (1973Tr05).
8442 *3*			1+(2)	0.56,2.08	E(level): Doublet. Other: 8439 *10* (1960Hi13). J$^{\pi}$: (4^{+})+1^{-} for doublet.
8655 *3*			0+2	0.68,0.83	E(level): Other: 8654 *10* (1960Hi13).
8870 *3*			1	0.68	E(level): Other: 8864 *10* (1960Hi13).
9004[#] *12*					
9166 *5*					E(level): Level in parentheses without describing the reason of its use. Presented with the literature values around 9143, see 1969An08.
9280	2^{+},4^{+},0^{+}		2	1.16	E(level): Other: 9282 *12* (1960Hi13^{-} possible doublet).
9460	3^{+},1^{+}		2	0.98	E(level): Other: 9456 *12* (1960Hi13).
9520			2	2.39	E(level): Other: 9517 *12* (1960Hi13).
9826 *4*	1^{+},0^{+},2^{+},3^{+},4^{+}		(0)+2	0.09,1.07	E(level): Other: 9826 *12* (1960Hi13).
9959 *6*			(0+2)	0.35,0.62	E(level): Other: 9960 *15* (1960Hi13).
10025[#] *15*					
10055[#] *15*			(0)+2	0.44,1.45	
10160	0^{-},1^{-},2^{-},3^{-}		(1)	0.30	E(level): Other: 10161 *15* (1960Hi13).

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^{23}Na(^{3}He,d),(^{3}He,dγ) 1969An08,1978Ga19,2004Ha50 (continued)

^{24}Mg Levels (continued)

E(level)[†]	Jπ[@]	L[b]	S(2J+1)[c]	Comments
10335 *4*				E(level): Other: (10300 *50*) (1960Hi13).
10350		2	2.24	E(level): Other: 10353 *20* (1960Hi13).
10577[#] *20*				
10661[#] *20*				
10734 *4*		0+2	2.33,0.95	E(level): Doublet. Other: 10723 *20* (1960Hi13).
10838 *3*	$3^+,0^+,1^+,2^+,4^+$	(2)	0.25	E(level): Other: 10822 *20* (1960Hi13).
10920		2	0.35	E(level): Other: 10916 *20* (1960Hi13).
11010[#] *20*				
11188[#] *25*				E(level): Overlaps more than three with the Adopted Levels. Not referenced.
11313[#] *25*				
11380[#] *25*				
11457 *3*				E(level): Other: 11446 *25* (1960Hi13).
11511[#] *25*				
11698.6[‡] *13*	4^+[&]	2,2+4[‡]	0.055[d]	S(2J+1): From (2J+1)C^{2}S=0.11 value for L=2, and 0.0485+0.0215 for L=2+4 from 0.097+0.043 (2004Ha50).
11724 *5*				
11831.7[‡] *18*		0,1,2,3[‡]		(2J+1)C^{2}S=(0.039) for L=0, 0.0090 for L=1, 0.015 for L=2, 0.024 for L=3 (2004Ha50).
11862.7[‡] *12*		1[‡]		E(level): Other: 11861 *25* (1960Hi13). (2J+1)C^{2}S=0.026 for L=1 (2004Ha50).
11936.5[‡] *12*		2,0+2[‡]		L: also 1+3 or 2+4. (2J+1)C^{2}S=0.25 for L=2, 0.021+0.24 for L=0+2, 0.085+0.20 for L=1+3, 0.23+0.13 for L=2+4 (2004Ha50).
11965.3[‡] *12*	2^+[&]	0,0+2[‡]	0.042[d]	S(2J+1): From (2J+1)C^{2}S=0.084 for L=0, 0.032+0.006 for 0+2 from 0.064+0.012 (2004Ha50).
11992.9[‡] *12*	2^+[&]	0+2[‡]	0.21+0.165[d]	S(2J+1): From (2J+1)C^{2}S=0.42+0.33 (2004Ha50).
12019.0[‡] *12*	3^-[&]	1[‡]	0.065[d]	S(2J+1): From (2J+1)C^{2}S=0.13 (2004Ha50).
12051.8[‡] *12*	4^+[&]	2[‡]	0.065[d]	E(level): Other: 12047 *5* (1969An08). S(2J+1): from (2J+1)C^{2}S=0.13 (2004Ha50).

[†] From 1969An08, except otherwise noted.
[‡] From 2004Ha50.
[#] From 1960Hi13.
[@] Suggested values from 1978Ga19 based on DWBA analysis and measured σ(θ), except otherwise noted.
[&] From Adopted Levels.
[a] From 1969An08.
[b] From 1978Ga19 or 1978Ga19.
[c] From 1978Ga19, except where otherwise noted.
[d] From (2J+1)C^{2}S in 2004Ha50 using C^2=1/2 for T=0 or 1, if known. Otherwise the value is listed in comments.

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$\gamma(^{24}Mg)$

E_γ [†]	E_i(level)	E_f
1368.5 *8*	1368.5	0.0
2751.8 *15*	4121.8	1368.5
3867.2 *14*	5235.3	1368.5
4237.2 *16*	4237.2	0.0
4636.4 *16*	6002.9	1368.5

[†] From 1969An08.

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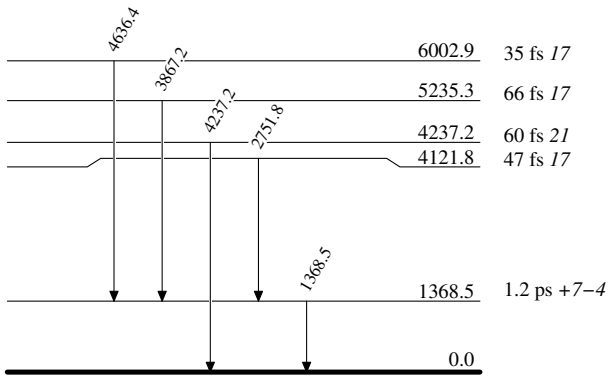
Level Scheme



$^{24}_{12}Mg_{12}$