Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171, 1 (2021)	1-Jun-2020

Q(β^-)=−16950 *SY*; S(n)=19525 *SY*; S(p)=141.0 *5*; Q(α)=−8606 *11* 2017Wa10
ΔQ(β^-)=500 (syst), ΔS(n)=400 (syst) (2017Wa10); Q(εp)=4640.6 *4* (2017Wa10).
S(2n)=36390 *600* (syst), S(2p)=5645.2 *4* (2017Wa10).
Other reactions:
1969Ce01: ^{28}Si(p,^{6}He), E=54.7 MeV − First observation of ^{23}Al.
2002Ca04: ^{12}C(^{23}Al,X), E=35.9 MeV/nucleon − Proton halo. Also 2002Zh49.
2016Fa10: C(^{28}Si,X), E=135 MeV/nucleon − Mechanism of two-proton emission from ^{23}Al mainly sequential.

^{23}Al Levels

Cross Reference (XREF) Flags

A	^{23}Si ε decay	E	^{12}C(^{23}Al,^{23}Al′)
B	^{9}Be(^{22}Mg,^{23}Alγ)	F	^{22}Mg(p,p):res
C	^{9}Be(^{24}Si,^{23}Al)	G	^{24}Mg(^{7}Li,^{8}He)
D	^{9}Be(^{25}Al,^{23}Alγ)	H	^{12}C(^{23}Al,p^{22}Mg)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	5/2$^+$	446 ms *6*	ABCD FGH	%ε+%β^+=100; %εp=1.04 *3* μ=+3.89 *22*; Q=0.16 *5* %εp: Considering all I$_p$ in 2011Sa15 and by replacing 0.14 *3* and 0.18 *4* for I$_p$[Ep(Lab) 197 and 255, respectively] of 2011Sa15 by 0.026 *2* and 0.118 *3*, respectively, in 2020Fr04 − deduced from the values of 0.063 *4* and 0.288 *10* for I$_p$[Ep(c.m.) 204 and 275, respectively] in 2020Fr04, reported relative to I$_p$[Ep(Lab) 839 2011Sa15]=0.41 *1*. %εp=1.22 *5* from 2011Sa15. Others: 1.1 (1995Ti08), relative Ip in 2000Pe28. T$_{1/2}$: From 2006Ia03 (value 446 ms *6* in 2012Tr08 from the same group appears to be from the same experiment). Other values: 470 ms *30* (1972Go03), 350 ms *100* (2000Pe28), 476 ms *45* (2001Wa54,2002Wa33). J$^\pi$: Allowed decay to 3/2$^+$, 5/2$^+$, and 7/2$^+$ states in ^{23}Mg. From g factor measurement and calculations (2006Oz04). Also from experimental exclusive momentum distributions in (^{23}Al,p^{22}Mg) − (2011Ba27). Configuration=1d$_{5/2}$. Member of isospin quartet. μ: From 2006Oz04, 2019StZV − NMR (uncertainty *2*, smaller by an order, in 2019StZV is a typo − confirmed by N. Stone, email − dated Oct 8, 2020). Q: Preliminary value − Nuclear magnetic resonance (2009NaZV, 2014StZZ).
550 *20*	(1/2$^+$)		GH	%p=100; %IT=8.6×10^{-7} *17* %IT: From $\Gamma\gamma/(\Gamma\gamma+\Gamma p)$. $\Gamma\gamma$=6.35×10$_7$, average value of 5.49E-7 eV (^{7}Li,^{8}He) and $\Gamma\gamma$=7.2E−7 14 eV (^{23}Al,p^{22}Mg). Γp=74 eV (^{7}Li,^{8}He). Uncertainty from the input value. J$^\pi$: Member of isospin quartet.
1475 *39*	(3/2)$^+$[†]		A	%p≈100
1619 *6*	(7/2$^+$)		B D	%p<100 E(level): from Eγ. J$^\pi$: Tentatively assigned by 2008Ga17 (^{22}Mg,^{23}Alγ), compared to mirror state of ^{23}Ne at 1701.6 keV. Configuration=[^{22}Mg(2$^+$)⊗d$_{5/2}$]$_{7/2^+}$.
1773 *35*			G	%p≈100
2575 *34*			G	%p≈100
3000 *20*	(3/2$^+$)[‡]		F	
3140 *30*	(7/2$^+$,5/2$^+$)[‡]		F	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{23}Al Levels (continued)

E(level)	J^π	XREF	Comments
3197 *21*	$(3/2)^+$†	A G	%p≈100 E(level): Weighted average of 3166 *45* (^{23}Si ε decay) and 3204 *21* (^{7}Li,^{8}He). Uncertainty lowest input value.
3260 *30*	$(7/2^+,5/2^+)$‡	F	
3709 *24*	$(5/2)^+$†	A G	%p≈100 E(level): Weighted average of 3745 *45* (^{23}Si ε decay) and 3699 *24* (^{7}Li,^{8}He) Uncertainty lowest input value.
3950 *30*	$(7/2^+)$‡	F	
4156 *47*	$(7/2)^+$†	A	%p≈100
5134 *59*		A	%p≈100
11832 *48*	$(5/2)^+$†	A	%2p≈100 J^π: IAS to ^{23}Si parent.
12.7×10^3 *23*		E	E(level): From excitation energy window=10.5 to 15 MeV (2015Ma19 – (^{23}Al,^{23}Al′).

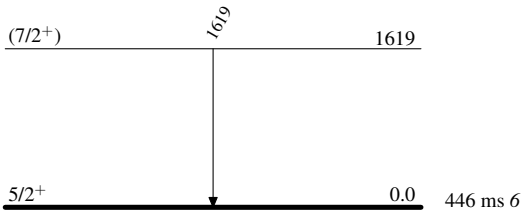
† From systematics of ^{23}Ne mirror states populated in ^{23}F decay.
‡ Proposed by 2007He30 (p,p):Res, based on R-matrix analysis (SAMMY-M6-BETA code) of measured differential cross sections.

γ(^{23}Al)

E_i(level)	J_i^π	E_γ	E_f	J_f^π	Comments
1619	$(7/2^+)$	1619 *6*	0.0	$5/2^+$	E_γ: Average of 1616 *6* (^{22}Mg,^{23}Alγ) and 1622 *6* (^{25}Al,^{23}Alγ).

Adopted Levels, Gammas

Level Scheme



$^{23}_{13}Al_{10}$