Adopted Levels, Gammas

Q(β^-)=−11874.4 *9*; S(n)=12740.3 *7*; S(p)=5896.2 *7*; Q(α)=−6429.7 *7* 2021Wa16
Q(β^-n)=−29632 *17*, from mass excesses of −1487 *17* for ^{34}K measured by 2024Dr01; −23047.3 *7* for ^{35}Ar from 2021Wa16. Value from 2021Wa16: Q(β^-n)=−29900 *200* (syst).
S(2n)=29805.6 *8*, S(2p)=11039.4 *7*, Q(ε)=5966.2 *7* (2021Wa16).
Isotope discovery (2012Th10): ^{32}S(α,n)^{35}Ar at Purdue (1940Ki12,1941Ki01,1941El04).
^{35}Ar production:
2012Zh06: ^{9}Be,^{181}Ta(^{40}Ar,X) at E(^{40}Ar)=57 MeV/nucleon at HIRFL. Measured momentum distributions and production cross sections of fragments. Observed competition between projectile fragmentation and other mechanisms. Compared with EPAX, abrasion- ablation, and HIPSE models. Studied target dependence of fragment cross sections. 35AR c 2007No13: ^{181}Ta(^{40}Ar,X) at E(^{40}Ar)=100 MeV/nucleon at RIKEN. Measured fragment momentum distributions and production cross sections.
^{35}Ar radius measurements:
2002Oz03: C(^{35}Ar,X) at E(^{35}Ar)≈950 MeV/nucleon at RIKEN. Measured interaction cross sections. Deduced effective radii and proton skin features.
2000Ge20: ^{35}Ar produced at ISOLDE. Measured β asymmetry and hyperfine structure using β-NMR spectroscopy. Deduced mean squared charge radii and quadrupole moments.
1996Kl04,1995KlZZ: ^{35}Ar produced by ISOLDE. Measured isotope shifts and hyperfine structure using collinear fast-beam laser spectroscopy. Deduced mean square charge radii and electric quadrupole moments.
^{35}Ar mass measurement: 2011Tu09.
Theoretical calculations: 2020Ri06, 2020RiZX, 2020RiZZ.

^{35}Ar Levels

Cross Reference (XREF) Flags

A	^{35}K ε decay (175 ms)	E	^{24}Mg(^{16}O,αnγ)	I	^{36}Ar(p,d)
B	^{36}Ca εp decay (100.9 ms)	F	^{32}S(α,n)	J	^{36}Ar(d,t)
C	^{1}H(^{36}Ar,d)	G	^{33}S(^{3}He,nγ)	K	^{36}Ar(^{3}He,α)
D	^{16}O(^{24}Mg,αnγ)	H	^{35}Cl(^{3}He,t)		

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	3/2$^+$	1.7756 s *14*	ABCDEFG IJK	%ε+%β^+=100 μ=+0.6322 *2* (2002Ma41,2019StZV) Q=−0.084 *15* (1996Kl04,2021StZZ) μ: β−NMR (2002Ma41). Others: +0.633 *2* (1965Ca04), +0.633 *7* (1996Kl04). Measured using β-NMR method. Also from 2019StZV, 1989Ra17. Q: β-NMR (1996Kl04). Also from 2021StZZ. J$^\pi$: L(p,d)=L(d,t)=L(^{3}He,α)=L^{1}H(^{36}Ar,d)=2 from 0$^+$. Allowed ε+β^+ feedings to 1/2$^+$ levels in ^{35}Cl. Mirror level: 3/2$^+$ ^{35}Cl g.s. T$_{1/2}$: weighted average of 1.83 s *3* (1956Ki29), 1.83 s *2* (1959Al10), 1.79 s *1* (1960Ja12), 1.84 s *10* (1960Wa04), 1.76 s *3* (1963Ne05), 1.770 s *6* (1969Wi18), 1.787 s *12* (1971Ge04), 1.774 s *4* (1977Az01), and 1.7754 s *11* (2006Ia05). Evaluated rms nuclear charge radius R=3.3636 fm *42* (2013An02).
1184.08 *25*	1/2$^+$		ABC FG IJK	XREF: F(890) E(level): 1963Ne05 (α,n) observed the first excited state in ^{35}Ar at 890 *50* keV. J$^\pi$: L(p,d)=L(d,t)=L(^{3}He,α)=0 from 0$^+$.
1750.78 *22*	(5/2)$^+$		A DEFG IJK	XREF: F(2030)I(1700)J(1700)K(1738) E(level): 1963Ne05 (α,n) observed the second excited state in ^{35}Ar at 2030 *80* keV. J$^\pi$: L(^{3}He,α)=2 from 0$^+$. Mirror level: 5/2$^+$ at 1763 keV in ^{35}Cl.
2603.22 *28*	7/2$^{(+)}$		DE G	J$^\pi$: ΔJ=2 γ to 3/2$^+$ in (^{16}O,αnγ). Mirror level: 7/2$^+$ at 2646 keV in ^{35}Cl.
2638.01 *26*	3/2$^+$		A IJK	XREF: I(2615)

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Adopted Levels, Gammas (continued)

^{35}Ar Levels (continued)

E(level)[†]	J^π	XREF	Comments
			J^π: L(p,d)=L(^{3}He,α)=2 from 0^+ with J dependence in (p,d).
2982.79 *12*	$5/2^+$	A C IJK	XREF: I(2970) J^π: L(p,d)=L(d,t)=L(^{3}He,α)=2 from 0^+ with J dependence in (p,d).
3196.98[‡] *26*	$7/2^-$	CDE G IJK	J^π: L(p,d)=L(^{3}He,α)=3 from 0^+. ΔJ=1 γ to $(5/2)^+$ and ΔJ=2 γ to $3/2^+$ in (^{16}O,$\alpha n\gamma$) and (^{24}Mg,$\alpha n\gamma$); band assignment.
3884 *10*	$1/2^+$	K	J^π: L(^{3}He,α)=0 from 0^+.
4012 *10*	$1/2^-,3/2^-$	K	J^π: L(^{3}He,α)=1 from 0^+.
4065.0? *4*	$(1/2^+,3/2^+,5/2^+)$	A	XREF: A(?) J^π: possibly allowed $\varepsilon+\beta^+$ feeding from $3/2^+$ parent with log *ft*=5.6 *+4−2*.
4110 *10*		K	
4142 *10*	$1/2^-,3/2^-$	K	J^π: L(^{3}He,α)=1 from 0^+.
4359.0 *5*	$(9/2^-)$	DE K	J^π: ΔJ=(1) γ to $7/2^-$ in (^{16}O,$\alpha n\gamma$). Possible mirror level: $9/2^-$ at 4348 keV in ^{35}Cl.
4528.3 *4*	$(1/2^+,3/2^+,5/2^+)$	A K	J^π: possibly allowed $\varepsilon+\beta^+$ feeding from $3/2^+$ parent with log *ft*=5.4 *+4−2*.
4725.9 *6*	$1/2^+$	A Hi K	XREF: i(4756) J^π: L(^{3}He,α)=0 from 0^+. Other: L(p,d)=0 from 0^+ for a group at 4756 *28*.
4785.8 *11*	$1/2^+,3/2^+,5/2^+$	A Hi K	XREF: i(4756) J^π: allowed $\varepsilon+\beta^+$ feeding from $3/2^+$ parent with log *ft*=5.2 *2*. Other: L(p,d)=0 from 0^+ for a group at 4756 *28*.
5048 *10*		K	
5113 *10*	$3/2^+,5/2^+$	HI K	E(level): weighted average of 5102 *20* from (p,d) and 5116 *10* from (^{3}He,α). J^π: L(^{3}He,α)=2 from 0^+. Discrepancy: L(p,d)=3 from 0^+ (1968Ko04).
5205 *10*		H K	
5384.2[‡] *4*	$(11/2^-)$	DE I K	XREF: I(5400) J^π: ΔJ=2 γ to $7/2^-$ in (^{16}O,$\alpha n\gamma$) and (^{24}Mg,$\alpha n\gamma$); band assignment. γ to $(9/2^-)$ in (^{16}O,$\alpha n\gamma$) and (^{24}Mg,$\alpha n\gamma$). Possible mirror level: $11/2^-$ at 5407 keV in ^{35}Cl.
5484 *10*	$3/2^+,5/2^+$	H K	J^π: L(^{3}He,α)=2 from 0^+.
5572.67 *15*	$3/2^+$	A G	T=3/2 XREF: G(5537) J^π: isobaric analog state of $3/2^+$ ^{35}K g.s. with log *ft*=3.31 *4*. L(^{3}He,n)=(0) from $3/2^+$.
5592 *10*	$3/2^+,5/2^+$	C HI K	XREF: C(5570) Evaluators consider the 5992 level to be different from the T=3/2 level at 5572.67 because (p,d) and (^{3}He,α) from T=0 should not populate T=3/2 levels. E(level): weighted average of 5598 *20* from (p,d) and 5591 *10* from (^{3}He,α). J^π: L(p,d)=L(^{3}He,α)=2 from 0^+.
5613.6 *9*	$(11/2^-)$	E	J^π: Possible mirror level: $11/2^-$ at 5927 keV in ^{35}Cl.
5765.8 *5*	$(13/2^-)$	DE	J^π: ΔJ=1 γ to $(11/2^-)$ in (^{16}O,$\alpha n\gamma$) and (^{24}Mg,$\alpha n\gamma$). ΔJ=(2) γ to $(9/2^-)$ in (^{16}O,$\alpha n\gamma$). Possible mirror level: $13/2^-$ at 6087 keV in ^{35}Cl.
5913 *5*		H JK	E(level): From (d,t). Other: 5911 *10* from (^{3}He,α).
5991 *3*		J	
6037 *3*	$3/2^+,5/2^+$	HIJK	XREF: I(6024)K(6033) J^π: L(p,d)=L(^{3}He,α)=2 from 0^+.
6055? *3*		J	XREF: J(?)
6076 *3*		J	
6163 *3*		JK	E(level): weighted average of 6164 *3* from (d,t) and 6153 *10* from (^{3}He,α).
6253 *3*		JK	E(level): From (d,t). Other: 6258 *10* from (^{3}He,α).
6273 *3*		J	
6302 *3*		J	
6332 *3*		J	

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Adopted Levels, Gammas (continued)

^{35}Ar Levels (continued)

E(level)†	J$^\pi$	XREF	Comments
6345 *3*	(1/2,3/2,5/2)	A J	E(level): From (d,t). Other: 6348 *11* from ^{35}K ε decay. J$^\pi$: $\varepsilon+\beta^+$ feeding from 3/2$^+$ parent with log *ft*=7.2 *1*.
6415 *2*		J	
6439? *4*		J	XREF: J(?)
6460 *3*		J	
6523 *3*		J	
6557 *3*		J	
6585 *3*		J	
6606 *3*		iJk	XREF: i(6620)k(6631)
6617 *2*		iJk	XREF: i(6620)k(6631) J$^\pi$: L(p,d)=L(^{3}He,α)=0 from 0$^+$ gives 1/2$^+$ for a group at 6620 *30* and 6631 *10*, respectively, which could be a multiplet of 6606+6617+6644+6651 in (d,t).
6644 *3*		iJk	XREF: i(6620)k(6631)
6651 *3*		iJk	XREF: i(6620)k(6631)
6673 *4*	5/2$^-$,7/2$^-$	IJ	XREF: I(6700) E(level): weighted average of 6700 *20* from (p,d) and 6672 *3* from (d,t). J$^\pi$: L(p,d)=3 from 0$^+$.
6826 *10*	3/2$^+$,5/2$^+$	I K	E(level): weighted average of 6820 *30* from (p,d) and 6827 *10* from (^{3}He,α). J$^\pi$: L(p,d)=2 from 0$^+$.
6959 *10*		K	
7051 *10*	3/2$^+$,5/2$^+$	A I K	XREF: I(7030) E(level): weighted average of 7053 *11* from ^{35}K ε decay, 7030 *20* from (p,d), and 7055 *10* from (^{3}He,α). J$^\pi$: L(p,d)=2 from 0$^+$.
7117 *10*		K	
7255 *11*		A	
7289 *10*		A K	E(level): weighted average of 7283 *11* from ^{35}K ε decay and 7293 *10* from (^{3}He,α).
7427 *10*		A K	E(level): weighted average of 7431 *11* from ^{35}K ε decay and 7423 *10* from (^{3}He,α).
7509 *10*	1/2$^+$,3/2$^+$,5/2$^+$	A K	E(level): weighted average of 7518 *11* from ^{35}K ε decay and 7502 *10* from (^{3}He,α). J$^\pi$: allowed $\varepsilon+\beta^+$ feeding from 3/2$^+$ parent with log *ft*<5.0.
7840 *10*		K	
8019 *10*		K	
8109.7‡ *13*	(15/2$^-$)	E	J$^\pi$: γ to (11/2$^-$) and (13/2$^-$) in (^{16}O,$\alpha n\gamma$); band assignment. Possible mirror level: 15/2$^-$ at 8319 keV in ^{35}Cl.
8212.6 *8*	(15/2$^-$)	E	J$^\pi$: ΔJ=2 γ to (11/2$^-$) and γ to (13/2$^-$) in (^{16}O,$\alpha n\gamma$). Possible mirror level: 15/2$^-$ at 8487 keV in ^{35}Cl.
8393? *20*	1/2$^+$,3/2$^+$,5/2$^+$	A	XREF: A(?) E(level): From (^{35}K ε decay). J$^\pi$: allowed $\varepsilon+\beta^+$ feeding from 3/2$^+$ parent with log *ft*=4.6 *+3−2*.
9906.0‡ *20*	(19/2$^-$)	E	J$^\pi$: ΔJ=2 γ to (15/2$^-$) in (^{16}O,$\alpha n\gamma$); band assignment. Possible mirror level: 19/2$^-$ at 10180 keV in ^{35}Cl.
12277.0‡ *32*	(23/2$^-$)	E	J$^\pi$: ΔJ=2 γ to (19/2$^-$) in (^{16}O,$\alpha n\gamma$); band assignment. Possible mirror level: 23/2$^-$ at 12571 keV in ^{35}Cl.

† From a least-squares fit to γ-ray energies for levels connected with γ transitions; from particle-transfer reactions or ^{35}K $\varepsilon+\beta^+$-delayed proton decays for other levels.
‡ Band(A): Band based on $f_{7/2}$ orbital.

Adopted Levels, Gammas (continued)

$\gamma(^{35}Ar)$

E_i(level)	J^π_i	E_γ [†]	I_γ [†]	E_f	J^π_f	Mult. [‡]	Comments
1184.08	1/2+	1184.1 *3*	100	0.0	3/2+		E_γ: weighted average of 1184.0 *3* from ^{35}K ε decay and 1184.3 *4* from ^{36}Ca εp decay.
1750.78	(5/2)+	1750.6 *3*	100	0.0	3/2+		E_γ: weighted average of 1750.5 *3* from ^{35}K ε decay, 1750.7 *4* from (^{24}Mg,αnγ), and 1750.8 *5* from (^{16}O,αnγ).
2603.22	7/2(+)	851.9 *9*	12.3 *33*	1750.78	(5/2)+		E_γ: weighted average of 852 *1* from (^{24}Mg,αnγ) and 851.8 *9* from (^{16}O,αnγ). I_γ: weighted average of 10 *5* from (^{24}Mg,αnγ) and 13.3 *33* from (^{16}O,αnγ).
		2603.0 *5*	100 *10*	0.0	3/2+	Q	E_γ: weighted average of 2603.0 *5* from (^{24}Mg,αnγ) and 2602.6 *15* from (^{16}O,αnγ). I_γ: other: 100 *22* from (^{24}Mg,αnγ).
2638.01	3/2+	886.8[#] *5*	16[#] *6*	1750.78	(5/2)+		
		2638.0[#] *4*	100[#] *13*	0.0	3/2+		
2982.79	5/2+	1798.9[#] *5*	3.5[#] *6*	1184.08	1/2+		
		2982.68[#] *13*	100[#] *4*	0.0	3/2+		
3196.98	7/2−	593.7 *2*	16.4 *30*	2603.22	7/2(+)		E_γ: weighted average of 593 *1* from (^{24}Mg,αnγ) and 593.7 *2* from (^{16}O,αnγ). I_γ: weighted average of 16 *8* from (^{24}Mg,αnγ) and 16.4 *30* from (^{16}O,αnγ).
		1446.2 *2*	100 *8*	1750.78	(5/2)+	D	E_γ: weighted average of 1446.2 *2* from (^{24}Mg,αnγ), 1446.1 *6* from (^{16}O,αnγ), and 1446.0 *6* from (^{3}He,nγ). I_γ: other: 100 *9* from (^{24}Mg,αnγ).
		3197.0 *7*	21 *5*	0.0	3/2+	Q	E_γ: From (^{24}Mg,αnγ). Other: 3197 *6* from (^{16}O,αnγ). I_γ: weighted average of 18 *5* from (^{24}Mg,αnγ) and 24 *5* from (^{16}O,αnγ).
4065.0?	(1/2+,3/2+,5/2+)	1426.8[#] *4*	100[#]	2638.01	3/2+		
4359.0	(9/2−)	1162.0 *8*	65 *24*	3196.98	7/2−	(D)	E_γ: weighted average of 1162 *1* from (^{24}Mg,αnγ) and 1162.0 *8* from (^{16}O,αnγ). I_γ: unweighted average of 41 *11* from (^{24}Mg,αnγ) and 88 *18* from (^{16}O,αnγ).
		1756 *1*	100 *15*	2603.22	7/2(+)		E_γ: weighted average of 1756 *1* from (^{24}Mg,αnγ) and 1756.3 *14* from (^{16}O,αnγ). I_γ: From (^{24}Mg,αnγ). Other: 100 *53* from (^{16}O,αnγ).
4528.3	(1/2+,3/2+,5/2+)	4527.9[#] *7*	100[#]	0.0	3/2+		
4725.9	1/2+	3542.0[#] *6*	100[#] *21*	1184.08	1/2+		

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Adopted Levels, Gammas (continued)

$\gamma(^{35}Ar)$ (continued)

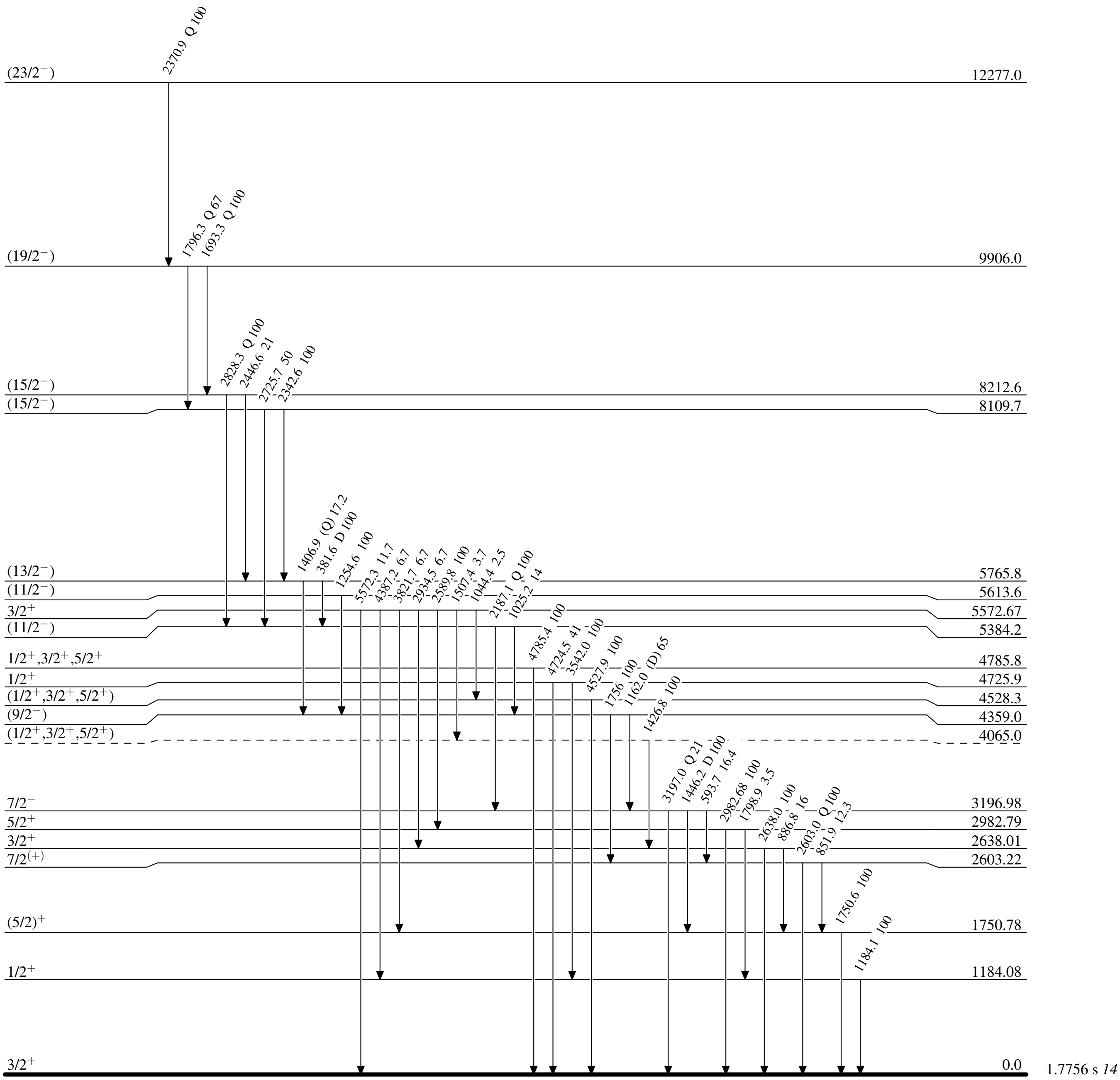
E_i(level)	J^{π}_i	E_γ†	I_γ†	E_f	J^{π}_f	Mult.‡	Comments
4725.9	1/2+	4724.5# *11*	41# *17*	0.0	3/2+		
4785.8	1/2+,3/2+,5/2+	4785.4# *11*	100#	0.0	3/2+		
5384.2	(11/2−)	1025.2 *4*	14 *4*	4359.0	(9/2−)		E_γ: weighted average of 1025 *1* from (^{24}Mg,$\alpha n\gamma$) and 1025.2 *4* from (^{16}O,$\alpha n\gamma$). I_γ: weighted average of 21 *8* from (^{24}Mg,$\alpha n\gamma$) and 12 *4* from (^{16}O,$\alpha n\gamma$).
		2187.1 *4*	100 *6*	3196.98	7/2−	Q	E_γ: weighted average of 2187.4 *4* from (^{24}Mg,$\alpha n\gamma$) and 2186.8 *4* from (^{16}O,$\alpha n\gamma$). I_γ: other: 100 *13* from (^{24}Mg,$\alpha n\gamma$).
5572.67	3/2+	1044.4# *4*	2.5# *8*	4528.3	(1/2+,3/2+,5/2+)		
		1507.4# *5*	3.7# *8*	4065.0?	(1/2+,3/2+,5/2+)		
		2589.8# *1*	100# *4*	2982.79	5/2+		
		2934.5# *5*	6.7# *12*	2638.01	3/2+		
		3821.7# *7*	6.7# *14*	1750.78	(5/2)+		
		4387.2# *9*	6.7# *16*	1184.08	1/2+		
		5572.3# *10*	11.7# *31*	0.0	3/2+		
5613.6	(11/2−)	1254.6 *8*	100	4359.0	(9/2−)		
5765.8	(13/2−)	381.6 *1*	100 *10*	5384.2	(11/2−)	D	E_γ: weighted average of 381.6 *1* from (^{24}Mg,$\alpha n\gamma$) and 381.5 *3* from (^{16}O,$\alpha n\gamma$).
		1406.9 *7*	17.2 *35*	4359.0	(9/2−)	(Q)	
8109.7	(15/2−)	2342.6 *28*	100 *25*	5765.8	(13/2−)		
		2725.7 *14*	50 *13*	5384.2	(11/2−)		
8212.6	(15/2−)	2446.6 *16*	21 *7*	5765.8	(13/2−)		
		2828.3 *7*	100 *18*	5384.2	(11/2−)	Q	
9906.0	(19/2−)	1693.3 *27*	100 *20*	8212.6	(15/2−)	Q	
		1796.3 *25*	67 *20*	8109.7	(15/2−)	Q	
12277.0	(23/2−)	2370.9 *25*	100	9906.0	(19/2−)	Q	

† From (^{16}O,$\alpha n\gamma$), unless otherwise noted.
‡ Deduced by evaluators from measured $\gamma\gamma(\theta)$(ADO) in (^{16}O,$\alpha n\gamma$) and ratios of yields R($\gamma(\theta)$) in (^{24}Mg,$\alpha n\gamma$), unless otherwise noted.
# From ^{35}K ε decay.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{35}_{18}Ar_{17}$

Adopted Levels, Gammas