

Adopted Levels, Gammas

- $Q(\beta^-)=14170$ 40; $S(n)=5297$ 8; $S(p)=15830.7$ 89; $Q(\alpha)=-14894.0$ 78 2021Wa16
 $S(p), Q(\alpha)$: Deduced by the evaluator using mass excesses of 8318 5 for ^{34}Mg : a weighted average of 8323 7 (2019As04) and 8315 5 (2025Ly01), and 12245.3 26 for ^{31}Na measured by 2025Ly01; -224 7 for ^{35}Al from 2021Wa16. Values from 2021Wa16:
 $S(p)=15836$ 10, $Q(\alpha)=-14895$ 16.
 $S(2p)=38400.5$ 85, $Q(\epsilon)=-15753$ 10, from mass excesses of 23598.8 43 for ^{33}Na and 15529.5 71 for ^{35}Mg measured by 2025Ly01; -224 7 for ^{35}Al from 2021Wa16. Values from 2021Wa16: $S(2p)=38580$ 450, $Q(\epsilon)=-15860$ 270.
 $S(2n)=7869$ 10, $Q(\beta^-n)=11697$ 7 (2021Wa16).
Isotope discovery (2012Th10): $\text{C}(^{40}\text{Ar}, \text{X})$ projectile fragmentation at Berkeley (1979Sy01).
 ^{35}Al production:
2015Mo17: $^9\text{Be}(^{40}\text{Ar}, \text{X})$ at $E(^{40}\text{Ar})=95$ MeV/nucleon at RIKEN. Measured angular distributions and transverse momentum distributions of fragments. Deduced formulation for the width of transverse momentum distribution as a function of fragment velocity.
2012Kw02: $^9\text{Be}, ^{\text{nat}}\text{Ni}, ^{181}\text{Ta}(^{40}\text{Ar}, \text{X})$ at $E(^{40}\text{Ar})=140$ MeV/nucleon at NSCL. Measured fragmentation cross sections, parallel momentum transfers, and widths. Compared with empirical formula EPAX, and predictions from internuclear cascade and deep inelastic models using Monte Carlo ISABEL-GEMINI and DIT-GEMINI codes.
2012Zh06: $^9\text{Be}(^{40}\text{Ar}, \text{X})$ at $E(^{40}\text{Ar})=57$ 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.
2007No13: $^9\text{Be}(^{40}\text{Ar}, \text{X})$ at $E(^{40}\text{Ar})=100$ MeV/nucleon at RIKEN. Measured fragment momentum distributions and production cross sections.
 ^{35}Al decay measurements:
2017Ha23: $^9\text{Be}(^{40}\text{Ar}, \text{X})$ at HIRFL. Measured $T_{1/2}$.
2005Ti11, 2006AnZW: $(^{36}\text{S}, \text{X})$ at GANIL. Measured $T_{1/2}$, β^- -delayed γ and neutron spectroscopy.
2001Nu01, 2002Nu02: $\text{U}(p, \text{X})$ at CERN. Measured $T_{1/2}$, β^- -delayed γ and neutron spectroscopy.
1999YoZW: $^9\text{Be}(^{48}\text{Ca}, \text{X})$ and $^{181}\text{Ta}(^{48}\text{Ca}, \text{X})$ at RIKEN. Measured $T_{1/2}$ and $\% \beta^-n$.
1995ReZZ, 2008ReZZ: $^{232}\text{Th}(p, \text{X})$ at LAMPF. Measured $T_{1/2}$ and $\% \beta^-n$, and average E_n .
1989Le16, 1989MuZU: $^{181}\text{Ta}(^{48}\text{Ca}, \text{X})$ at GANIL. Measured $T_{1/2}$ and $\% \beta^-n$.
1988Mu08, 1988MuZY, 1988BaYZ: $^{181}\text{Ta}(^{86}\text{Kr}, \text{X})$ at GANIL. $T_{1/2}$ and $\% \beta^-n$.
 ^{35}Al knockout-reaction measurements:
2012No05: $^{33,34,35,36}\text{Al}$ produced by $\text{Be}(^{48}\text{Ca}, \text{X})$ fragmentation at $E(^{48}\text{Ca})=900$ MeV/nucleon at GSI. Measured $1n$ removal cross sections and longitudinal momentum distributions of the residues. Deduced single-particle occupancies in the ground states of $^{33,34,35}\text{Al}$. $\sigma(^{35}\text{Al} \rightarrow ^{34}\text{Al})=75$ mb 4 and $\sigma(^{36}\text{Al} \rightarrow ^{35}\text{Al})=95$ mb 5.
2010Ro23: ^{35}Al produced by $^9\text{Be}(^{40}\text{Ar}, \text{X})$ fragmentation at $E(^{40}\text{Ar})=700$ MeV/nucleon at GSI. Measured $1n$ knockout cross sections and longitudinal momentum distributions of the residues. $\sigma(^{35}\text{Al} \rightarrow ^{34}\text{Al})=65$ mb 18.
 ^{35}Al radius measurement:
2006Kh08: ^{35}Al produced by $^{181}\text{Ta}(^{48}\text{Ca}, \text{X})$ fragmentation at $E(^{48}\text{Ca})=60.3$ MeV/nucleon at GANIL. Measured energy-integrated reaction cross sections at 30-65 MeV/nucleon using a silicon telescope as both active target and detector. Deduced reduced strong absorption radii, isospin dependence, and possible halo structure or large deformation.
 ^{35}Al in-beam γ spectroscopy:
2006FuZX: ^{35}Al produced by $\text{Be}, \text{C}(^{40}\text{Ar}, \text{X})$ at $E(^{40}\text{Ar})=63$ MeV/nucleon at RIKEN. $\text{He}(^{35}\text{Al}, \text{X})$ at $E(^{35}\text{Al})=40$ MeV/nucleon. Observed one γ ray at 760.1 keV 21 without placing it in the level scheme.
 ^{35}Al mass measurements: 2017Ga20, 2007Ju03, 1991Or01, 1991Zh24, 1987Gi05.
Theoretical calculations (binding energies, deformation, quadrupole moments, radii, levels, J , π , mass, $T_{1/2}$, etc): 2016Sa46, 2014Ca21, 2013Li39, 2013Sh05, 2011Ki12, 2009Yo05, 2004Kh16, 1994Po05.

 ^{35}Al LevelsCross Reference (XREF) Flags

- A $^{36}\text{Mg} \beta^-n$ decay (6.9 ms)
B $^9\text{Be}(^{36}\text{Si}, ^{35}\text{Al}\gamma)$
C $\text{Pb}(^{35}\text{Al}, ^{34}\text{Al}n\gamma)$
D Coulomb excitation

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Adopted Levels, Gammas (continued) ^{35}Al Levels (continued)

<u>E(level)[†]</u>	<u>J^π</u>	<u>T_{1/2}</u>	<u>XREF</u>	<u>Comments</u>
0	(5/2) ⁺	38.1 ms 4	ABCD	<p>$\% \beta^- = 100$; $\% \beta^- n = 36$ 3; $\% \beta^- 2n = ?$ $\% \beta^- n$: Weighted average of 38 2 (2005Ti11,2006AnZW) and 41 13 (2001Nu01,2002Nu02), 26 4 (1995ReZZ,2008ReZZ), and 40 10 (1989Le16,1989MuZU). Other: 43 9 (1999YoZW, preliminary), 87 +37-25 (1988Mu08,1988BaYZ) with an unphysical upper bound. J^π: From shell-model calculations and $L(^{36}\text{Si}, ^{35}\text{Al})=2$ from 0⁺. $T_{1/2}$: weighted average of 38.4 ms 3 (2017Ha23, implant-β correlation), 36.8 ms 5 (2005Ti11,2006AnZW, implant-β correlation), 38.6 ms 4 (2001Nu01,2002Nu02, three β-counting rates and one γ-counting rate), 30 ms 4 (1995ReZZ,2008ReZZ, implant-β/n correlation), 170 ms +90-50 (1989Le16,1989MuZU, β-decay curve), 30 ms 10 (1988DuZT, beam pulsations), and 130 ms +100-50 (1988Mu08,1988BaYZ, β counting rate). Reduced strong absorption radius=1.188 fm² 14 from 2006Kh08. Major configurations for $J^\pi=5/2^+$ of ^{35}Al g.s. from Pb($^{35}\text{Al}, ^{34}\text{Aln}\gamma$): (g.s., 4⁻ in ^{34}Al)\otimesvp_{3/2}, S=0.36 9 (2017Ch36); (46 keV, 1⁺ in ^{34}Al)\otimesvd_{3/2}, S=1.47 22 (2017Ch36); (1.4 MeV, 2⁺ in ^{34}Al)\otimesvs_{1/2}, S=0.16 1 (2021Bh12); (2.5 MeV, 3⁻ in ^{34}Al)\otimesvp_{3/2}, S=1.48 18 (2021Bh12).</p>
802 3			AB	
1007 4			B D	<p>XREF: D(1020) B(E2)\uparrow=0.0142 52 (1999Ib01). B(E1)\uparrow≤0.00020 9, B(E2)\uparrow≤0.0125 56, B(M1)\uparrow≤0.0024 11, and 5/2⁺ → 3/2⁺ σ=30 mb 14 (2000PrZX). The multipolarities are assumed.</p>
1866 4			B	
1975 4	3/2 ⁺ , 5/2 ⁺		B	
2734 7			B	
3245 5	3/2 ⁺ , 5/2 ⁺		B	
4275? 9	3/2 ⁺ , 5/2 ⁺		B	XREF: B(4275?)

[†] From a least-squares fit to γ -ray energies. $\gamma(^{35}\text{Al})$

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Comments</u>
802		802 4	100	0	(5/2) ⁺	
1007		1006 6	100	0	(5/2) ⁺	E _γ : weighted average of 1003 4 from ($^{36}\text{Si}, ^{35}\text{Al}\gamma$) and 1020 9 from Coulomb excitation.
1866		859 4	100 8	1007		
		1064 4	22 6	802		
1975	3/2 ⁺ , 5/2 ⁺	968 4	59 4	1007		
		1174 5	37 4	802		
		1972 6	100 7	0	(5/2) ⁺	
2734		1932 6	100	802		
3245	3/2 ⁺ , 5/2 ⁺	2237 6	100 8	1007		
		2440 7	18.0 26	802		
		3250 8	42 5	0	(5/2) ⁺	
4275?	3/2 ⁺ , 5/2 ⁺	4275 9	100	0	(5/2) ⁺	

[†] From $^9\text{Be}(^{36}\text{Si}, ^{35}\text{Al}\gamma)$, unless otherwise noted.

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

