

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  $^{34}\text{Mg}$ : a weighted average of 8323 7 ([2019As04](#)) and 8315 5 ([2025Ly01](#)), and 12245.3 26 for  $^{31}\text{Na}$  measured by [2025Ly01](#); -224 7 for  $^{35}\text{Al}$  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  $^{33}\text{Na}$  and 15529.5 71 for  $^{35}\text{Mg}$  measured by [2025Ly01](#); -224 7 for  $^{35}\text{Al}$  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](#)).  
 $^{35}\text{Al}$  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.  
 $^{35}\text{Al}$  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  $T_{1/2}$ ,  $\beta^-$ -delayed  $\gamma$  and neutron spectroscopy.  
[2001Nu01, 2002Nu02](#):  $\text{U}(p, \text{X})$  at CERN. Measured  $T_{1/2}$ ,  $\beta^-$ -delayed  $\gamma$  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  $\% \beta^-n$ .  
 $^{35}\text{Al}$  radius measurement:  
[2006Kh08](#):  $^{35}\text{Al}$  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.  
 $^{35}\text{Al}$  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  $^{33,34,35}\text{Al}$ .  $\sigma(^{35}\text{Al}->^{34}\text{Al})=75$  mb 4 and  $\sigma(^{36}\text{Al}->^{35}\text{Al})=95$  mb 5.  
[2010Ro23](#):  $^{35}\text{Al}$  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.  $\sigma(^{35}\text{Al}->^{34}\text{Al})=65$  mb 18.  
 $^{35}\text{Al}$  in-beam  $\gamma$  spectroscopy:  
[2006FuZX](#):  $^{35}\text{Al}$  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  $\gamma$  ray at 760.1 keV 21 without placing it in the level scheme.  
 $^{35}\text{Al}$  mass measurements: [2017Ga20](#), [2007Ju03](#), [1991Or01](#), [1991Zh24](#), [1987Gi05](#).  
Theoretical calculations (binding energies, deformation, quadrupole moments, radii, levels,  $J$ ,  $\pi$ , mass,  $T_{1/2}$ , etc): [2016Sa46](#), [2014Ca21](#), [2013Li39](#), [2013Sh05](#), [2011Ki12](#), [2009Yo05](#), [2004Kh16](#), [1994Po05](#).

 $^{35}\text{Al}$  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)** $^{35}\text{Al}$  Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>J<sup>π</sup></u>	<u>T<sub>1/2</sub></u>	<u>XREF</u>	<u>Comments</u>
0	(5/2) <sup>+</sup>	38.1 ms 4	ABCD	<p>%β<sup>-</sup>=100; %β<sup>-</sup>n=36 3; %β<sup>-</sup>2n=?</p> <p>%β<sup>-</sup>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.</p> <p>J<sup>π</sup>: From shell-model calculations and L(<sup>36</sup>Si,<sup>35</sup>Al)=2 from 0<sup>+</sup>.</p> <p>T<sub>1/2</sub>: 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).</p> <p>Reduced strong absorption radius r<sub>0</sub><sup>2</sup>=1.188 fm<sup>2</sup> 14 from the energy-integrated σ of Si(<sup>35</sup>Al,X) (2006Kh08).</p> <p>Major configurations for J<sup>π</sup>=5/2<sup>+</sup> of <sup>35</sup>Al g.s. from Pb(<sup>35</sup>Al,<sup>34</sup>Alnγ): (g.s., 4<sup>-</sup> in <sup>34</sup>Al)⊗vp<sub>3/2</sub>, S=0.36 9 (2017Ch36); (46 keV, 1<sup>+</sup> in <sup>34</sup>Al)⊗vd<sub>3/2</sub>, S=1.47 22 (2017Ch36); (1.4 MeV, 2<sup>+</sup> in <sup>34</sup>Al)⊗vs<sub>1/2</sub>, S=0.16 1 (2021Bh12); (2.5 MeV, 3<sup>-</sup> in <sup>34</sup>Al)⊗vp<sub>3/2</sub>, S=1.48 18 (2021Bh12).</p>
802 3			AB	XREF: D(1020)
1007 4			B D	
				B(E1)↑=0.0142 52 (1999Ib01). B(E1)↑≤0.00020 9, B(E2)↑≤0.0125 56, B(M1)↑≤0.0024 11, and 5/2 <sup>+</sup> → 3/2 <sup>+</sup> σ=30 mb 14 (2000PrZX). The multipolarities are assumed.
1866 4			B	XREF: B(4275?)
1975 4	3/2 <sup>+</sup> , 5/2 <sup>+</sup>		B	
2734 7			B	
3245 5	3/2 <sup>+</sup> , 5/2 <sup>+</sup>		B	
4275? 9	3/2 <sup>+</sup> , 5/2 <sup>+</sup>		B	

<sup>†</sup> From a least-squares fit to γ-ray energies.γ(<sup>35</sup>Al)

<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>†</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Comments</u>
802		802 4	100	0	(5/2) <sup>+</sup>	E <sub>γ</sub> : weighted average of 1003 4 from ( <sup>36</sup> Si, <sup>35</sup> Alγ) and 1020 9 from Coulomb excitation.
1007		1006 6	100	0	(5/2) <sup>+</sup>	
1866		859 4	100 8	1007		
		1064 4	22 6	802		
1975	3/2 <sup>+</sup> , 5/2 <sup>+</sup>	968 4	59 4	1007		
		1174 5	37 4	802		
		1972 6	100 7	0	(5/2) <sup>+</sup>	
2734		1932 6	100	802		
3245	3/2 <sup>+</sup> , 5/2 <sup>+</sup>	2237 6	100 8	1007		
		2440 7	18.0 26	802		
		3250 8	42 5	0	(5/2) <sup>+</sup>	
4275?	3/2 <sup>+</sup> , 5/2 <sup>+</sup>	4275 9	100	0	(5/2) <sup>+</sup>	

<sup>†</sup> From <sup>9</sup>Be(<sup>36</sup>Si,<sup>35</sup>Alγ), unless otherwise noted.

**Adopted Levels, Gammas**Level Scheme

Intensities: Relative photon branching from each level

