

Adopted Levels, Gammas

$Q(\beta^-)=15753\ 10$ ;  $S(n)=859.8\ 87$ ;  $S(p)=2.344\times 10^4\ 60$ ;  $Q(\alpha)=-1.808\times 10^4\ 27$

$Q(\beta^-), S(n), S(p), Q(\alpha)$ : Deduced by the evaluator using mass excesses of 15529.5 71 for  $^{35}\text{Mg}$  measured by [2025Ly01](#), and 8318 5 for  $^{34}\text{Mg}$ ; a weighted average of 8323 7 ([2019As04](#)) and 8315 5 ([2025Ly01](#));  $-224\ 7$  for  $^{35}\text{Al}$ , 31680 600 for  $^{34}\text{Na}$ , and 31180 270 for  $^{31}\text{Ne}$  from [2021Wa16](#). Values from [2021Wa16](#):  $Q(\beta^-)=15860\ 270$ ,  $S(n)=750\ 270$ ,  $S(p)=23330\ 660$ ,  $Q(\alpha)=-17970\ 380$ .

$S(2n)=5576.0\ 76$ ,  $Q(\beta^-n)=10455.8\ 74$ , from mass excesses of 15529.5 71 for  $^{35}\text{Mg}$  measured by [2025Ly01](#); 4962.9 27 for  $^{33}\text{Mg}$  and  $-2997.6\ 21$  for  $^{34}\text{Al}$  from [2021Wa16](#). Values from [2021Wa16](#):  $S(2n)=5470\ 270$ ,  $Q(\beta^-n)=10570\ 270$ .

$S(2p)=45070\ 660$  (syst) ([2021Wa16](#)).

Isotope discovery ([2012Th10](#)):  $\text{Ta}(^{48}\text{Ca}, X)$  projectile fragmentation at GANIL ([1989Gu03, 1991Or01](#)).

$^{35}\text{Mg}$  production:

[2012Kw02](#):  $^{35}\text{Mg}$  produced by  $\text{natNi}(^{40}\text{Ar}, X)$  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.

[2011FuZZ](#):  $^{35}\text{Mg}$  produced by  $^9\text{Be}(^{48}\text{Ca}, X)$  fragmentation at  $E(^{48}\text{Ca})=345$  MeV/nucleon at RIKEN. Measured thick target fragmentation, deduced production cross sections, and compared with EPAX-2.15 systematics.

[2007Ts09](#): Analyzed fragmentation  $\sigma$  of n-rich Na, Mg isotopes (including  $^{35}\text{Mg}$ ) from  $^9\text{Be}, ^{181}\text{Ta}(^{48}\text{Ca}, X)$ . Used systematics based on average binding energy to extrapolate towards drip line, predicting  $\sigma$  for  $^{40}\text{Mg}$  and discussing  $^{39}\text{Na}$ . Compared different extrapolation models.

$^{35}\text{Mg}$  decay measurements:

[2013StZY](#):  $^9\text{Be}(^{48}\text{Ca}, X)$  at RIKEN. Measured  $T_{1/2}$ .

[1999YoZW](#):  $^9\text{Be}(^{48}\text{Ca}, X)$  and  $^{181}\text{Ta}(^{48}\text{Ca}, X)$  at RIKEN. Measured  $T_{1/2}$  and  $\% \beta^- n$ .

$^{35}\text{Mg}$  radius measurements:

[2011Ka01](#):  $^{35}\text{Mg}$  produced by  $^9\text{Be}(^{48}\text{Ca}, X)$  fragmentation at GSI. Measured interaction cross sections with C and  $\text{CH}_2$  targets at 900 MeV/nucleon. Deduced rms matter radii.

[2006Kh08](#):  $^{35}\text{Mg}$  produced by  $^{181}\text{Ta}(^{48}\text{Ca}, X)$  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.

$^{35}\text{Mg}$  mass measurements: [2025Ly01](#), [2007Ju03](#), [2001Sa72](#), [2000Sa21](#), [1991Or01](#).

Theoretical calculations (binding energies, deformation, quadrupole moments, radii, levels, J,  $\pi$ , mass,  $T_{1/2}$ , etc): [2023Ra22](#), [2021Ka07](#), [2020Mi15](#), [2016Ba59](#), [2016Sa46](#), [2016Sh05](#), [2015Sh21](#), [2014Ga13](#), [2014Wa14](#), [2013Ch31](#), [2013Li39](#), [2013Sh05](#), [2012Fo27](#), [2012Ho19](#), [2007Ha53](#), [2006Zh19](#), [2005Ch71](#), [2004Kh16](#), [1996Re10](#), [1991Pa19](#), [1991Pa21](#).

 $^{35}\text{Mg}$  LevelsCross Reference (XREF) Flags

- A  $^{35}\text{Na}\ \beta^-$  decay (2.1 ms)  
 B  $^9\text{Be}(^{38}\text{Si}, ^{35}\text{Mg}\gamma)$   
 C  $\text{C}(^{36}\text{Mg}, ^{35}\text{Mg}\gamma), (^{37}\text{Al}, ^{35}\text{Mg}\gamma)$

| $E(\text{level})^\dagger$ | $J^\pi$          | $T_{1/2}$ | XREF | Comments  |
|---------------------------|------------------|-----------|------|---|
| 0                         | $(3/2^-, 5/2^-)$ | 11.3 ms 6 | BC   | $\% \beta^- = 100$ ; $\% \beta^- n = 52\ 46$ ; $\% \beta^- 2n = ?$<br>$\% \beta^- n$ : from <a href="#">1995ReZZ, 2008ReZZ</a> . Other: 52 11 ( <a href="#">1999YoZW</a> , preliminary).<br>Theoretical $\% \beta^- 0n = 29$ , $\% \beta^- 1n = 66$ , $\% \beta^- 2n = 5$ ( <a href="#">2021Mi17</a> ).<br>Theoretical $\% \beta^- 0n = 65$ , $\% \beta^- 1n = 32$ , $\% \beta^- 2n = 3$ ( <a href="#">2019Mo01</a> ).<br>$J^\pi$ : $3/2^-$ from shell-model calculations with the SDPF-M and SDPF-M+2p $_{1/2}$ interactions ( <a href="#">2017Mo26</a> ). Near degenerate $3/2^-$ and $5/2^-$ g.s. from Monte Carlo shell-model calculations with the SDPF-M interaction ( <a href="#">2011Ga15</a> ), and $3/2^-$ g.s. from shell-model calculations with the SDPF-U interaction ( <a href="#">2011Ga15</a> ). $3/2^-$ from projection of the odd-neutron angular momentum along the symmetry axis and parity of the wave function ( <a href="#">2019Mo01</a> ). Others: $3/2^+$ from antisymmetrized molecular dynamics (AMD) calculations with the Gogny DIS force ( <a href="#">2017Mo26</a> ).<br>$T_{1/2}$ : 11.3 ms 5 (stat) 4 (syst) ( <a href="#">2013StZY</a> , implant- $\beta$ correlation). Other: 72 ms |

Continued on next page (footnotes at end of table)

**Adopted Levels, Gammas (continued)** $^{35}\text{Mg}$  Levels (continued)

| <u>E(level)<sup>†</sup></u> | <u>J<sup>π</sup></u>                   | <u>XREF</u> | <u>Comments</u>   |
|-----------------------------|--|-------------|---|
|                             |  |             | 43 (2008ReZZ,1995ReZZ) and $\approx 9$ ms (1999YoZW, implant- $\beta$ correlation, preliminary).<br>Reduced strong absorption radius $r_0^2=1.64$ fm <sup>2</sup> 15 from the energy-integrated $\sigma$ of<br>Si( $^{35}\text{Mg},X$ ) (2006Kh08). The rms matter radius $R_{\text{rms}}^m=3.40$ fm 24 from the interaction $\sigma$<br>of C,CH <sub>2</sub> ( $^{35}\text{Mg},X$ ) (2011Ka01).  |
| 0+x                         |  | BC          | E(level): $x \leq 80$ keV (2011Ga15 detection threshold); $x \leq 200$ keV (2017Mo26 detection threshold).<br>J <sup>π</sup> : Shell-model calculations with the SDPF-M+2p <sub>1/2</sub> interaction predict a 1/2 <sup>-</sup> level at 141 keV (2017Mo26). Shell-model calculations with the SDPF-M interaction predict a 5/2 <sup>-</sup> level at 84 keV (2017Mo26). Monte Carlo shell-model calculations with the SDPF-M interaction predict a 3/2 <sup>-</sup> level at 30 keV (2011Ga15). |
| 0+y?                        |  | C           | XREF: C(?)<br>E(level): $y \leq 200$ keV (2017Mo26 detection threshold). 2017Mo26 suggested a low-lying L=3 level from the observed L=3 component in the inclusive parallel momentum distribution.  |
| 206+x 8                     |  | C           | J <sup>π</sup> : 2017Mo26 stated that based on the observed weak $\gamma$ -ray intensity, this level is not the 1/2 <sup>-</sup> level at 141 keV predicted by shell-model calculations with the SDPF-M+2p <sub>1/2</sub> interaction.  |
| 445+x 5                     | (3/2 <sup>+</sup> , 5/2 <sup>+</sup> ) | BC          | J <sup>π</sup> : L( $^{36}\text{Mg},^{35}\text{Mg}$ )=(2) from 0 <sup>+</sup> . 3/2 <sup>+</sup> from shell-model calculations with the SDPF-M+2p <sub>1/2</sub> interaction (2017Mo26).  |
| 619+x 7                     | (1/2 <sup>-</sup> , 3/2 <sup>-</sup> ) | BC          | J <sup>π</sup> : L( $^{36}\text{Mg},^{35}\text{Mg}$ )=(1) from 0 <sup>+</sup> . 3/2 <sup>-</sup> from shell-model calculations with the SDPF-M+2p <sub>1/2</sub> interaction (2017Mo26).  |
| 670+x 8                     |  | BC          |   |

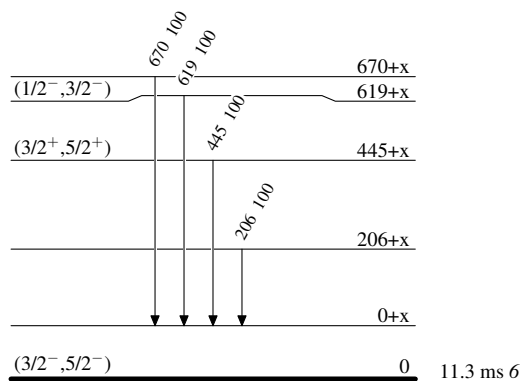
<sup>†</sup> From E $\gamma$  data in ( $^{38}\text{Si},^{35}\text{Mg}\gamma$ ) and ( $^{36}\text{Mg},^{35}\text{Mg}\gamma$ ), ( $^{37}\text{Al},^{35}\text{Mg}\gamma$ ).

 $\gamma(^{35}\text{Mg})$ 

| <u>E<sub>i</sub>(level)</u> | <u>J<sub>i</sub><sup>π</sup></u>       | <u>E<sub><math>\gamma</math></sub></u> | <u>I<sub><math>\gamma</math></sub></u> | <u>E<sub>f</sub></u> | <u>Comments</u>   |
|-----------------------------|--|--|--|----------------------|---|
| 206+x                       |  | 206 8                                  | 100                                    | 0+x                  | E $\gamma$ : From 2017Mo26.   |
| 445+x                       | (3/2 <sup>+</sup> , 5/2 <sup>+</sup> ) | 445 5                                  | 100                                    | 0+x                  | E $\gamma$ : weighted average of 443 7 (2017Mo26) and 446 5 (2011Ga15).   |
| 619+x                       | (1/2 <sup>-</sup> , 3/2 <sup>-</sup> ) | 619 7                                  | 100                                    | 0+x                  | E $\gamma$ : weighted average of 616 8 (2017Mo26) and 621 7 (2011Ga15).   |
| 670+x                       |  | 670 8                                  | 100                                    | 0+x                  | E $\gamma$ : From 2011Ga15, as this $\gamma$ is not resolved from the 616 $\gamma$ in 2017Mo26, but its presence is indicated in the fit of the spectrum. 2017Mo26 stated that the origin of the 670 $\gamma$ remained vague. |

**Adopted Levels, Gammas****Level Scheme**

Intensities: Relative photon branching from each level

 $^{35}_{12}\text{Mg}_{23}$