

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 149, 1 (2018)	1-Jan-2018

$Q(\beta^-)=15.09\times 10^3$ 18; $S(n)=1.58\times 10^3$ 17; $S(p)=21.18\times 10^3$ 40; $Q(\alpha)=-15.74\times 10^3$ 30 2017Wa10
 $Q(\beta^-n)=8870$ 150, $S(2n)=7250$ 180, $S(2p)=40470$ 710 (2017Wa10).

First identification of ^{39}Si by 1979We10.

1979We10: ^{39}Si produced and identified in the fragmentation of ^{48}Ca beam in $^9\text{Be}(^{48}\text{Ca},X)$ reaction at 212 MeV/nucleon.

1990AuZZ, 2003Au02: analysis with SPEG spectrometer of residuals in GANIL. Stable to neutron emission.

2004Gr20 (also 2003Gr22,2004Gr28): ^{39}Si produced in fragmentation of ^{48}Ca beam in $^9\text{Be}(^{48}\text{Ca},X)$ E=60 MeV/nucleon; GANIL.

Measured β , γ , $T_{1/2}$ using Si and Ge detectors.

2000Sa21 (also 2001Sa72): measured mass; reaction: $^{181}\text{Ta}(^{48}\text{Ca},X)$ at E=60 MeV/nucleon.

1999YoZW: $^9\text{Be}(^{48}\text{Ca},X)$ and $^{181}\text{Ta}(^{48}\text{Ca},X)$ E=70 MeV/nucleon. Measured $T_{1/2}$ and β^-n . Tentative results.

2006Kh08: $\text{Si}(^{39}\text{Si},X)$ E=44.75 and 38.99 MeV/nucleon. Measured cross sections and average radius at GANIL facility.

2011FuZZ: $^9\text{Be}(^{48}\text{Ca},X)$ E=345 MeV/nucleon. Measured thick target fragmentation.

Mass measurement: 2007Ju03, 2000Sa21, 2001Sa72.

Structure calculations: 2008Wi11 (quadrupole deformation parameter, potential surfaces for hypernuclei), 2009Co21 (half-life), 2012Ho19 (radii, deformation parameter).

 ^{39}Si LevelsCross Reference (XREF) Flags

- A $^9\text{Be}(^{40}\text{Si},^{39}\text{Si}\gamma)$
 B $^9\text{Be}(^{40}\text{P},^{39}\text{Si}\gamma),(^{42}\text{S},^{39}\text{Si}\gamma)$

E(level) [†]	J^π [‡]	$T_{1/2}$	XREF	Comments
0	(5/2 ⁻)	47.5 ms 20	AB	$\% \beta^- = 100$; $\% \beta^- n = ?$; $\% \beta^- 2n = ?$ J^π : from shell-model prediction (1997Mo25,2014St18) and systematics of neighboring nuclei (2017Au03). $T_{1/2}$: from 2004Gr20, obtained in a beam-on mode where the implanted ions are registered continuously with the decaying betas. Others: 33.0 ms 10 (2003Gr22), 40 ms (1999YoZW), $>1 \mu\text{s}$ from 1990AuZZ. $\% \beta^- n = 60$ 13 (tentative result, 1999YoZW). Theoretical $\% \beta^- n = 27.1$, $\% \beta^- 2n = 2.4$ (2003Mo09). $\sigma_R = 2.23$ b 12 at 44.75 MeV/nucleon, 2.62 b 18 at 38.99 MeV/nucleon (2006Kh08). Average $r_0^2 = 1.109$ fm ² 48 (2006Kh08). E(level): from $^9\text{Be}(^{40}\text{Si},^{39}\text{Si}\gamma)$ (2014St18). $T_{1/2}$: from maximum likelihood fit to the decaying 172-keV γ ray (2015St06), uncertainty is statistical only. Other: 0.90 ns 14 from broadened lineshape (2014St18) in $(^{40}\text{Si},^{39}\text{Si}\gamma)$.
0+x	(3/2 ⁻)		A	
171 5	(7/2 ⁻)	0.97 ns 7	AB	
399 13			B	
702 23			B	
828 25			B	
879? 4	(3/2 ⁺)		A	
1307 18			B	
1722 28			B	

[†] From a least-squares fit to γ -ray energies.

[‡] From shell-model predictions by 2014St18 in $(^{40}\text{Si},^{39}\text{Si}\gamma)$.

Adopted Levels, Gammas (continued)

$\gamma({}^{39}\text{Si})$								
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α^\ddagger	Comments
171	(7/2 ⁻)	171 5	100	0	(5/2 ⁻)	[M1]	0.00100 8	B(M1)(W.u.)=0.0049 +14-11 E _γ : weighted average of 172 5 in ⁹ Be(⁴⁰ Si, ³⁹ Siγ) and 163 12 in ⁹ Be(⁴⁰ P, ³⁹ Siγ),(⁴² S, ³⁹ Siγ).
399		397 14	100	0	(5/2 ⁻)			
702		303 19	100	399				
828		657 24	100	171	(7/2 ⁻)			
879?	(3/2 ⁺)	879 [#] 4	100	0	(5/2 ⁻)			
1307		906 17	100 [†] 23	399				
		1143 27	48 [†] 20	171	(7/2 ⁻)			
1722		1551 27	100	171	(7/2 ⁻)			

[†] From (⁴⁰P,³⁹Siγ),(⁴²S,³⁹Siγ).

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[#] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)