Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 140, 1 (2017)	30-Sep-2015

Q(β^-)=13.50×10^3 *26*; S(n)=4.96×10^3 *25*; S(p)=22860 *SY*; Q(α)=−17.38×10^3 *51* 2012Wa38
Δ(S(n))=550 (syst,2012Wa38).
S(2n)=6543 *240*, S(2p)=43220 *550* (syst), Q(β^-n)=10190 *250*, (2012Wa38).
First identification of ^{40}Si nuclide by 1989Gu03.
1989Gu03: ^{40}Si produced and identified in ^{181}Ta(^{48}Ca,X) reaction at 55 MeV/nucleon.
2004Gr20 (also 2004Gr28,2003Gr22): ^{40}Si produced by fragmentation of ^{48}Ca beam at 60 MeV/nucleon with a ^{9}Be target followed by separation of fragments by LISE3 spectrometer; measured β, γ, $T_{1/2}$.
2006Kh08: Si(^{40}Si,X) E=30-65 MeV. Measured cross section, deduced radius and isospin dependence. Measured $<r_0^2>$=1.21 fm^2 *6*.
Mass measurement: 2007Ju03, 2000Sa21 (also 2001Sa72).
Structure calculations: 2014Ca21 (energies and B(E2) of first 2$^+$ state), 2014Eb02 (low-lying electric dipole strengths of PDR, deformation), 2013Ha27 (deformation, binding energy), 2013Xu01 (binding energy, S(2n), S(2p), rms charge, moment).
Additional information 1.

^{40}Si Levels

Cross Reference (XREF) Flags

A ^{1}H(^{40}Si,P′γ),^{1}H(^{42}P,Xγ)
B C(^{44}S,^{40}Si$\alpha\gamma$)

E(level)	J$^\pi$	$T_{1/2}$	XREF	Comments
0	0$^+$	33.0 ms *10*	AB	%β^-=100; %β^-n=?; %β^-2n=? %β^-n=53 *12* (preliminary value from 1999YoZW). Theoretical %β^-n=48.7, %β^-2n=0.04 (2003Mo09). $T_{1/2}$: from 2004Gr20 (also 2003Gr22,2004Gr28). Calculated $T_{1/2}$(β^- decay)=30.6 ms (2003Mo09).
986 *5*	(2$^+$)		AB	J$^\pi$: systematics of even-even nuclides; also predicted by shell-model calculations (2012Ta20).
1624? *7*	(0$^+$,2$^+$,4$^+$)†		AB	E(level): 1614 *14* from 2012Ta20 in C(^{44}S,^{40}Si$\alpha\gamma$). J$^\pi$: predicted by shell-model calculations (2012Ta20).
1831? *8*			A	
2524? *19*	(4$^+$)†		B	E(level): this level is tentatively assigned by 2012Ta20 in C(^{44}S,^{40}Si$\alpha\gamma$) based on $\gamma\gamma$-coin as the first 4$^+$ state predicted by shell-model calculations. The resulting energy ratio between the first 4$^+$ and 2$^+$ states is $R_{4/2}$=2.56 *5*. Another possible candidate for the first 4$^+$ state is 1614 keV from the 629γ -> 985γ cascade (2012Ta20).

† From shell-model calculations 2012Ta20 suggest that the 2524 level is the first 4$^+$ state and that the 1624 level has J^π=0 or 2$^+$. They do not rule out the possibility that the 1624 level is the 4$^+$ state; however, they argue that the systematics of E(4$^+$)/E(2$^+$) ratio of neighbouring nuclei favors the first alternative.

Adopted Levels, Gammas (continued)

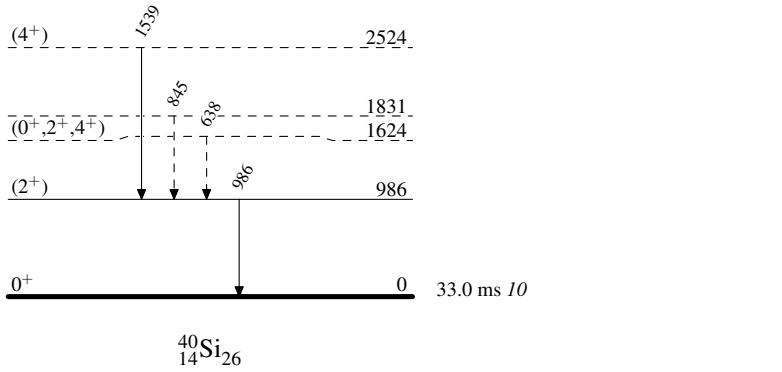
$\gamma(^{40}Si)$

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	Comments
986	(2^+)	986 *5*	0	0^+	E_γ: 985 *11* from 2012Ta20 in C(^{44}S,^{40}Si$\alpha\gamma$).
1624?	$(0^+,2^+,4^+)$	638[‡#] *5*	986	(2^+)	E_γ: 629 *8* from 2012Ta20 in C(^{44}S,^{40}Si$\alpha\gamma$).
1831?		845[‡#] *6*	986	(2^+)	
2524?	(4^+)	1539 *16*	986	(2^+)	E_γ: from 2012Ta20 in C(^{44}S,^{40}Si$\alpha\gamma$).

[†] From 2006Ca26 in ^{1}H(^{40}Si,p′γ),^{1}H(^{42}P,Xγ), unless otherwise noted.
[‡] Weak γ seen only in the pn removal reaction from ^{42}P (2006Ca26).
[#] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme



$^{40}_{14}Si_{26}$