Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ninel Nica, Balraj Singh	NDS 113,1563 (2012)	28-May-2012

Q(β^-)=4592 *15*; S(n)=7514 *15*; S(p)=1.878×10^4 *8*; Q(α)=−13498 *15* 2012Wa38
Note: Current evaluation has used the following Q record 4592 14 *7514* 14 *18809* 70-13490 *19* 2011AuZZ.
S(2n)=12022 *14*, S(2p)=33623 *23* (2011AuZZ).
Values in 2003Au03: Q(β^-)=4601 *15*, S(n)=7535 *21*, S(p)=18720 *70*, Q(α)=−13471 *16*, S(2n)=12018 *14*, S(2p)=33580 *23*.
Identifications and production of ^{34}Si: 1971Ar32 in ^{232}Th(^{40}Ar,X) at E=290 MeV. Later study: 1977Na05.
2008Wi09: ^{208}Pb(^{36}S,X) E=230 MeV. Measured Eγ using GAMMASPHERE array and CHICO arrays at ANL. The known γ rays of 125, 591, 930, 3326 and 4255 keV were observed in this work. Main study was for ^{35}P structure.
Measurement of strong absorption radius: 2006Kh08, 1999Ai02.
Additional information 1.
Structure calculations: 2009Bo16 (negative-parity intruders, shell model); 2009Gr04 (binding energy, charge radius, neutron density, shell model); 2007Co22 (binding energy, single proton transfer reactions); 2002St30 (shell closure effects); 2002Ut02 (levels, spins, shell model); 2001Ca49 (levels, spins, B(E2), shell model); 2000Pe27 (shell closure features); 2000Ro08 (2$^+$ levels, B(E2)); 1994Po05 (intruder levels);
1999Ai02: measurement of strong absorption radius; Si(^{34}P,X) reaction at 38-80 MeV/nucleon, NSCL facility. The ^{34}P beam was obtained from fragmentation of ^{55}Mn beam with ^{9}Be target at 50-90 MeV/nucleon.
1986Sm05, 1985Wo07: ^{64}Ni(^{36}S,^{34}Si) E=198 MeV. Measured σ, deduced mass excess.
Nuclear structure theoretical calculations:
1992Fu07: *pf*-shell occupation numbers, vanishing of N=20 shell gap.
1991He06: intruder states.
1988Wa04: levels, decay scheme parameters, shell model.

^{34}Si Levels

A 2133, (0$^+$) level proposed in 2001Nu01 but not confirmed by 2002Mi44 and 2003Iw02 is omitted here. The 1193 transition feeding from 3326 level to a 2133 level is placed from a 4519 level to 3326 level according to 2003Iw02.

Cross Reference (XREF) Flags

A	^{34}Al β^- decay (56.3 ms)	E	^{9}Be(^{35}Si,^{34}SiXγ)	I	^{160}Gd(^{36}S,Xγ)
B	^{35}Al β^-n decay (37.7 ms)	F	Si(^{34}Si,^{34}Si$'\gamma$)	J	Coulomb excitation
C	^{2}H(^{34}Si,^{34}Si$'\gamma$)	G	^{36}S(^{11}B,^{13}N)		
D	^{7}Li(^{34}P,^{7}Beγ)	H	^{36}S(^{14}C,^{16}O)		

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	0$^+$	2.77 s *20*	ABCDEFGHIJ	%β^-=100 Measured r$_0^2$=1.23 fm^2 *4* (2006Kh08) in Si(^{34}Si,X) reaction at 51.5 MeV/nucleon and 58.9 MeV/nucleon. Integral cross sections were also measured. r$_0^2$ (strong absorption)=1.20 fm^2 *8* (1999Ai02). T$_{1/2}$: from 1977Na05.
3327.14 *20*	2$^+$	82 fs *32*	ABCDEF IJ	J$^\pi$: level excited in Coulomb excitation, inelastic scattering, systematics, and shell-model predictions. T$_{1/2}$: from B(E2)=0.0085 *33* in Coul. ex. (1998Ib01).
3590 *25*			H	
4256.1 *4*	(3$^-$)	<210 ns	ABCDEF I	J$^\pi$: level excited in inelastic scattering, possible allowed β decay from (4$^-$), systematics, and shell-model predictions. T$_{1/2}$: estimated from $\beta\gamma$(t) (1989Ba50) in ^{34}Al β^- decay.
4380.2 *4*	(3$^-$)		ABCDE I	XREF: E(?). J$^\pi$: β transition from (4$^-$) is possibly allowed; gammas to 2$^+$ and (3$^-$).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{34}Si Levels (continued)

E(level)	J^π	XREF	Comments
4520.2? *11*		A CDE	
4971.1 *5*	$(3^-,4^-,5^-)$	A CDE	XREF: E(?). J^π: log *ft*=5.7 from (4^-).
5042.2? *11*		A CDE	
5330.4 *10*	2^+	D G	Measured angular distribution compared with theoretical predictions for ΔL=0 transition (^{7}Li(^{34}P,^{7}Beγ)). Deduced B(>)=0.74 *18*(stat) +00−14(syst) (^{7}Li(^{34}P,^{7}Beγ)).
6023.3? *11*		A CDE	

$\gamma(^{34}Si)$

E_i(level)	J_i^π	E_γ †	I_γ †	E_f	J_f^π	Mult.	α ‡	Comments
3327.14	2^+	3326.96 *20*	100	0.0	0^+	[E2]		B(E2)(W.u.)=2.6 *10*
4256.1	(3^-)	929.0 *3*	100 *10*	3327.14	2^+			
		4257 *3*	22 *3*	0.0	0^+	[E3]		I_γ: other: Iγ(4257)/Iγ(929)=0.53 *4* in ^{2}H(^{34}Si,^{34}Si′γ) is too high by a factor of ≈2.
4380.2	(3^-)	124.2 *3*	100 *8*	4256.1	(3^-)	[M1+E2]	0.025 *23*	α(K)=0.023 *22*; α(L)=0.0017 *16*
		1052.8 *4*	7.5 *12*	3327.14	2^+			
4520.2?		1193.34 *20*	100	3327.14	2^+			
4971.1	$(3^-,4^-,5^-)$	590.9 *3*	100	4380.2	(3^-)			
5042.2?		1715.4 *8*	100	3327.14	2^+			
5330.4	2^+	2000#	59 *9*	3327.14	2^+			E_γ,I_γ: from ^{7}Li(^{34}P,^{7}Beγ).
		5330	100	0.0	0^+			E_γ,I_γ: from ^{7}Li(^{34}P,^{7}Beγ).
6023.3?		2696.4 *12*	100	3327.14	2^+			

† From ^{34}Al β^- decay, unless otherwise stated.

‡ 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.

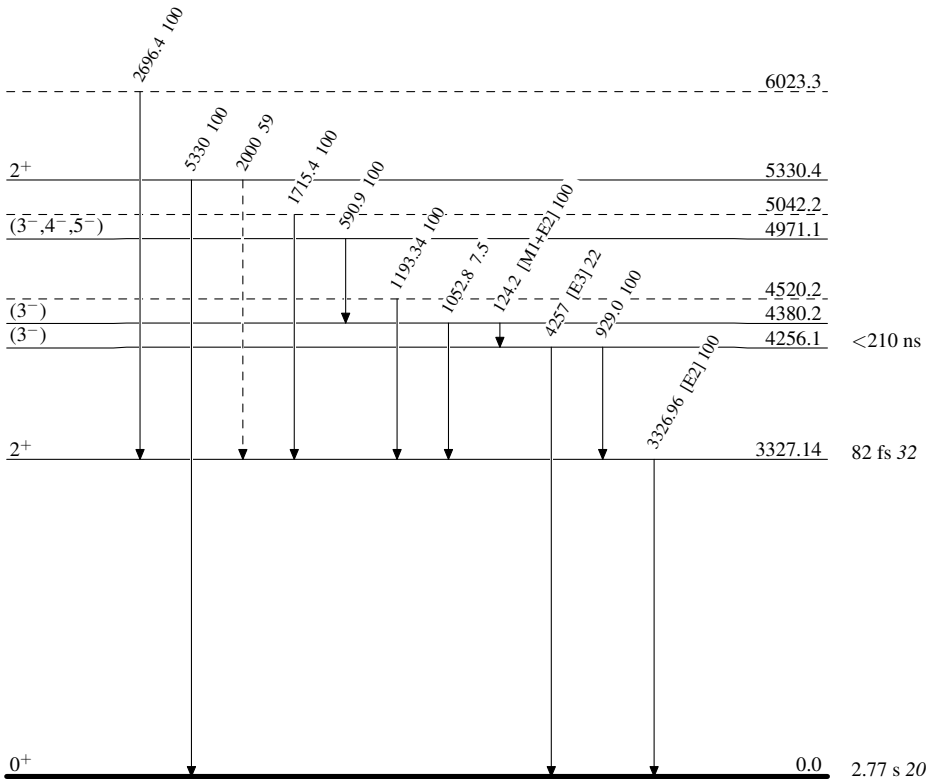
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{34}_{14}Si_{20}$