Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 201,1 (2025)	31-Oct-2024

Q(β^-)=−11134.4 *19*; S(n)=14371 *3*; S(p)=1581.1 *5*; Q(α)=−8611.8 *13* 2021Wa16
S(2n)=34152 *24*, S(2p)=7711.8 *6*, Q(εp)=3816.9 *6* (2021Wa16).
First identifications of ^{32}Cl: 1966Br17, 1966An01, 1968Ar03.
Mass measurements: 2010Wr01, 2008Bh08, 1977Ha29, 1971Go18, 1966Br17.
Mass deduced by IMME analysis: 2021Ka45, 2010Ka30, 2006Tr03.
Structure calculations:
2014Sa30: calculated levels, J, π.

^{32}Cl Levels

Proton branching ratios %p given under comments are from 2011Ma69 in (^{3}He,t).

Cross Reference (XREF) Flags

A	^{32}Ar ε decay (98 ms)	D	^{32}S(p,n)
B	^{9}Be(^{33}Cl,^{32}Clγ)	E	^{32}S(^{3}He,t),(^{3}He,tγ)
C	^{10}B(^{24}Mg,2nγ)	F	^{32}S(^{3}He,tγ)

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$ or Γ[@]	XREF	Comments
0	1$^+$	298 ms *1*	ABCDEF	%ε+%β^+=100; %εp=0.026 *5*; %$\varepsilon\alpha$=0.054 *8* μ=+1.115 *6* (2000Ro30,2019StZV) J$^\pi$: L(^{3}He,t)=2 from 0$^+$; allowed ε feedings to 0$^+$ (E=3379) and 2$^+$ (E=2231) states in ^{32}S. $T_{1/2}$: from 1968Ar03. Others: 281 ms *8* (1971Go18), 300 ms (1969St14), 294 ms *6* (1966An01), 306 ms *4* (1953Gl32), 320 ms *10* (1954Br12), 0.28 s (1954Ty33). μ: β-NMR spectroscopy on polarized ^{32}Cl nuclei obtained from fragmentation of 100 MeV/nucleon ^{36}Ar beam with ^{93}Nb target at NSCL facility (2000Ro30). Positive sign is predicted by shell-model calculations. %εp and %$\varepsilon\alpha$ from 1979Ho27.
89.9 *1*	(2)$^+$		ABC EF	J$^\pi$: L(^{3}He,t)=2 from 0$^+$; 2$^+$ for 78-keV level in ^{32}P mirror nucleus (1994Vo12).
461.1 *1*	(0)$^+$		ABC E	XREF: B(466?) J$^\pi$: L(^{3}He,t)=0 from 0$^+$; 0$^+$ for 513-keV level in ^{32}P mirror nucleus (1994Vo12).
1168.55 *13*	1$^+$		A CDE	XREF: D(1150) J$^\pi$: L(^{3}He,t)=2 from 0$^+$; allowed ε feeding (log *ft*=3.9) from 0$^+$ parent; 1$^+$ for 1149-keV level in ^{32}P mirror nucleus (1994Vo12).
1331.2 *5*	(2)$^+$		C E	Additional information 1. J$^\pi$: L(^{3}He,t)=2 from 0$^+$; 2$^+$ from comparison of $\sigma(\theta)$ data with CDE calculations in (^{3}He,t) (1989Je07); 2$^+$ for 1323-keV level in ^{32}P mirror nucleus (1994Vo12).
1736.7 *6*	(3$^+$)		C EF	Additional information 2. J$^\pi$: L(^{3}He,t)=(4) from 0$^+$; 3$^+$ from comparison of $\sigma(\theta)$ data with CDE calculations in (^{3}He,t) (1989Je07); 3$^+$ for 1755-keV level in ^{32}P mirror nucleus (1994Vo12).
2131.1 *4*	(3)$^+$		C EF	%p=7 *4* Additional information 3. J$^\pi$: L(^{3}He,t)=4 from 0$^+$; 3$^+$ from comparison of $\sigma(\theta)$ data with CDE calculations in (^{3}He,t) (1989Je07); 3$^+$ for 2177-keV level in ^{32}P mirror nucleus (1994Vo12).
2209.6 *5*	(1$^+$)		A EF	%p=54 *7* Additional information 4.

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Adopted Levels, Gammas (continued)

^{32}Cl Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$ or Γ@	XREF	Comments
				Jπ: L(^{3}He,t)=(2) from 0^+; 1^+ for 2230-keV level in ^{32}P mirror nucleus (1994Vo12).
2283.5 *5*	$(2)^+$		EF	%p=66 *13* Additional information 5. Jπ: L(^{3}He,t)=2 from 0^+; 2^+ for 2218-keV level in ^{32}P mirror nucleus (1994Vo12).
2611 *5*	(1^+)		E	%p>62 Jπ: from tp(θ) in (^{3}He,t).
2675 *5*			E	%p>78
2859 *4*	$1^+,2^+,3^+$		DE	%p>70 XREF: D(2790) Jπ: L(^{3}He,t)=2 from 0^+.
2936 *5*	(3^+)		E	%p>88 Jπ: L(^{3}He,t)=(4) from 0^+; 3^+ from comparison of $\sigma(\theta)$ data with CDE calculations in (^{3}He,t) (1989Je07).
3055 *5*	$2^-,3^-,4^-$		E	%p>97 Jπ: L(^{3}He,t)=3 from 0^+.
3165 *4*	$2^-,3^-,4^-$		E	%p>96 Jπ: L(^{3}He,t)=3 from 0^+.
3283 *5*	$1^+,2^+,3^+$		E	%p>88 Jπ: L(^{3}He,t)=2 from 0^+.
3694 *4*	(2^+)		dE	%p>96 XREF: d(3730) Jπ: 2^+ from mirror symmetry argument by 2011Ma69 in (^{3}He,t). But L(^{3}He,t)=3(+2) from 0^+ favors negative parity.
3771 *4*	1^+	3 keV *2*	A d	XREF: d(3730) Jπ: allowed ε feeding (log *ft*=4.4) from 0^+.
3.8×10^3	(6^-)#		D	
3878 *4*	(3^+)		E	%p>94 Jπ: 3^+ from mirror symmetry argument by 2011Ma69 in (^{3}He,t); L(^{3}He,t)=(4+5).
4001 *4*			E	
4078 *4*	1^+	17 keV *2*	A DE	XREF: D(4060) E(level): weighted average of 4082 *4* from ^{32}Ar ε decay, 4060 *30* from (p,n), and 4075 *4* from (^{3}He,t). Jπ: L(^{3}He,t)=2 from 0^+; allowed ε feeding (log *ft*=4.0) from 0^+ parent.
4352 *5*	$0^+,1^+$		E	Jπ: L(^{3}He,t)=0 from 0^+.
4578 *6*	(1)		A DE	XREF: A(4561) E(level): weighted average of 4561 *13* from ^{32}Ar ε decay, 4580 *30* from (p,n), and 4581 *6* from (^{3}He,t). Jπ: ε feeding from 0^+ parent (log *ft*=6.3).
4.7×10^3	(6^-)#		D	
4757 *9*	$3^+,4^+,5^+$		E	Jπ: L(^{3}He,t)=4 from 0^+.
4800 *5*	(1)		A	Jπ: ε feeding (log *ft*=6.2) from 0^+ parent.
5018 *6*			E	
5046.3 *3*	0^+	20 eV *5*	A	Γ_γ=1.7 eV *4* (2008Bh08) T=2 Γ and Γ_γ from 2008Bh08 in ^{32}Ar ε decay. Jπ: supper-allowed ε feeding from 0^+ parent (log *ft*=3.19); IAS of ^{32}Ar g.s.
5166 *5*	$(5^+,6^+,7^+)$		E	Jπ: L(^{3}He,t)=(6) from 0^+.
5303 *4*	1^+		A	Jπ: allowed ε feeding (log *ft*=5.15) from 0^+ parent.
5425 *4*	1^+	35 keV *20*	A d	XREF: d(5410)

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Adopted Levels, Gammas (continued)

^{32}Cl Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$ or Γ[@]	XREF	Comments
				J^π: allowed ε feeding (log *ft*=4.48) from 0^+ parent.
5466 *6*			dE	XREF: d(5410)
5531 *9*	1^+		A	J^π: allowed ε feeding (log *ft*=5.6) from 0^+ parent.
5578 *8*	$(5^+,6^+,7^+)$		E	J^π: L(^{3}He,t)=(6) from 0^+.
5.6×10^3	(6^-)[#]		D	
5700 *5*	1^+	25 keV *15*	A	J^π: allowed ε feeding (log *ft*=4.78) from 0^+ parent.
5813 *7*			E	
5905 *7*			E	
5990 *7*			E	
6065 *6*	1^+		A d	XREF: d(6060)
				J^π: allowed ε feeding (log *ft*=5.02) from 0^+ parent.
6076 *8*	$(5^+,6^+,7^+)$		dE	XREF: d(6060)
				J^π: L(^{3}He,t)=(6) from 0^+.
6178 *8*			E	
6254 *5*	1^+		A D	XREF: D(6290)
				J^π: allowed ε feeding (log *ft*=5.02) from 0^+ parent.
6.3×10^3	(6^-)[#]		D	
6360 *15*	$(5^+,6^+,7^+)$		E	J^π: L(^{3}He,t)=(6) from 0^+.
6529 *5*	1^+		A	J^π: allowed ε feeding (log *ft*=5.1) from 0^+ parent.
6597 *5*	1^+		A d	XREF: d(6650)
				J^π: allowed ε feeding (log *ft*=5.0) from 0^+ parent.
6680 *15*			dE	XREF: d(6650)
6732 *6*	1^+		A	J^π: allowed ε feeding (log *ft*=4.8) from 0^+ parent.
6.8×10^3	(6^-)[#]		D	
6820 *15*			E	
7320 *4*	1^+	20 keV *10*	A D	XREF: D(7360)
				J^π: allowed ε feeding (log *ft*=4.2) from 0^+ parent.
7.4×10^3	(6^-)[#]		D	
7450 *10*	1^+	<15 keV	A	J^π: allowed ε feeding (log *ft*=5.6) from 0^+ parent.
7600 *6*	1^+		A	J^π: allowed ε feeding (log *ft*=4.07) from 0^+ parent.
772×10^1 *10*			D	
7852 *5*	1^+		A	J^π: allowed ε feeding (log *ft*=4.08) from 0^+ parent.
8146 *9*	1^+		A	J^π: allowed ε feeding (log *ft*=4.6) from 0^+ parent.
830×10^1 *10*			D	
8.4×10^3	(6^-)[#]		D	
860×10^1 *10*			D	
9.2×10^3	(6^-)[#]		D	
9.8×10^3	(6^-)[#]		D	
1000×10^1 *10*			D	
1030×10^1 *10*			D	

[†] From Eγ data for excited levels connected with γ transitions and from ^{32}Ar ε decay based on measured proton energies of β-delayed proton branches or from (^{3}He,t) for other levels, unless otherwise noted.

[‡] From some levels, assignments of mirror levels in ^{32}P mirror nucleus are used, as proposed by 1994Vo12 in (^{3}He,t) and noted under the comments.

[#] From comparison of σ(θ) in (p,n) reaction with DWIA calculations.

[@] Γ from 1993Sc16 in ^{32}Ar ε decay, deduced from measured peak shape and calculated recoil broadening.

Adopted Levels, Gammas (continued)

γ(^{32}Cl)

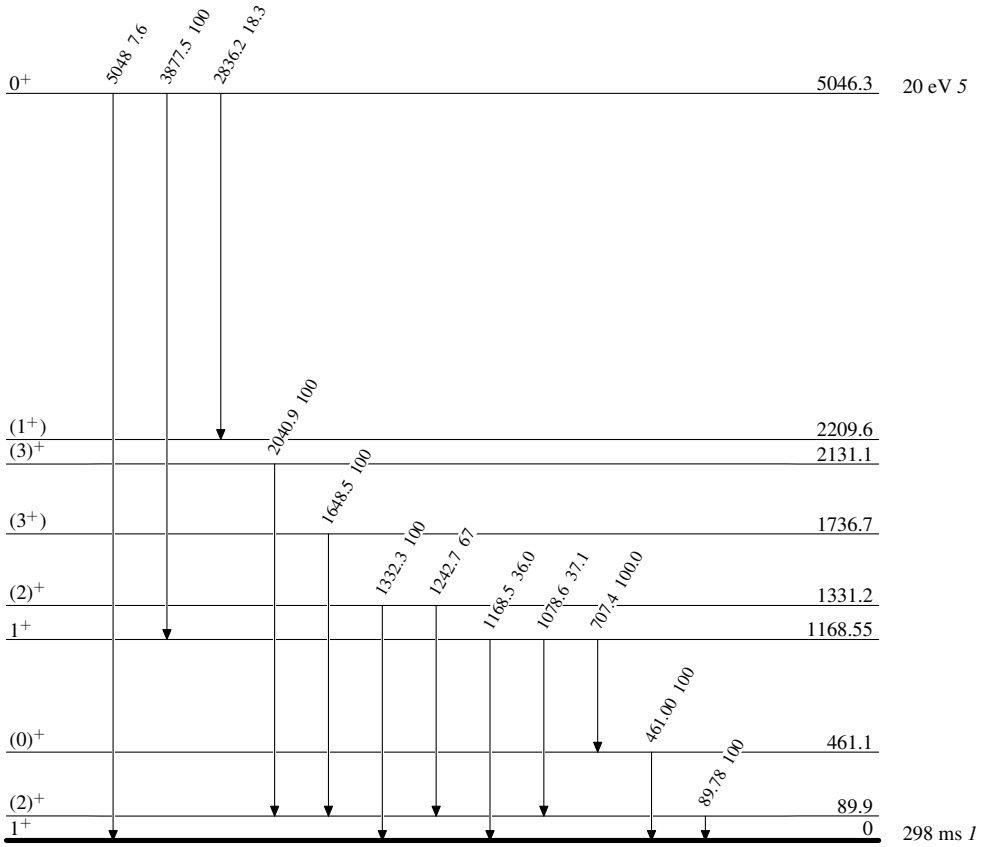
E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Comments
89.9	$(2)^+$	89.78 *13*	100	0	1^+	E_γ: unweighted average of 89.9 *1* from ^{32}Ar ε decay and 89.65 *5* from (^{24}Mg,2nγ).
461.1	$(0)^+$	461.00 *14*	100	0	1^+	E_γ: weighted average of 461.1 *1* from ^{32}Ar ε decay and 460.80 *14* from (^{24}Mg,2nγ).
1168.55	1^+	707.4 *3*	100.0 *27*	461.1	$(0)^+$	E_γ: weighted average of 707.3 *2* from ^{32}Ar ε decay and 708.0 *5* from (^{24}Mg,2nγ).
		1078.6 *3*	37.1 *19*	89.9	$(2)^+$	
		1168.5 *2*	36.0 *19*	0	1^+	
1331.2	$(2)^+$	1242.7[‡] *9*	67[‡] *7*	89.9	$(2)^+$	
		1332.3[‡] *6*	100[‡] *13*	0	1^+	
1736.7	(3^+)	1648.5[‡] *6*	100	89.9	$(2)^+$	E_γ: from (^{24}Mg,2nγ).
2131.1	$(3)^+$	2040.9[‡] *10*	100	89.9	$(2)^+$	
5046.3	0^+	2836.2 *10*	18.3 *23*	2209.6	(1^+)	
		3877.5 *3*	100 *21*	1168.55	1^+	
		5048 *5*	7.6 *15*	0	1^+	

[†] From ^{32}Ar ε decay, unless otherwise stated.
[‡] From (^{24}Mg,2nγ).

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{32}_{17}Cl_{15}$