^{31}Cl $\varepsilon+\beta^+$ decay:XUNDL-22 2025Bu00

Parent: ^{31}Cl: E=0; $J^\pi=3/2^+$; $T_{1/2}$=190 ms *1*; Q(ε)=12008 *3*; %ε+%β^+ decay=100
^{31}Cl-J^π: From Adopted Levels of ^{31}Cl in ENSDF database.
^{31}Cl-$T_{1/2}$,Q($\varepsilon+\beta^+$): from 2021Wa16.
^{31}Cl-%ε+%β^+ decay: %εp=2.08 *5* for ^{31}Cl decay, revised from %εp=2.4 *2* (2011SaZM).
Compiled (unevaluated) dataset from 2025Bu00: Phys Rev C xxx, xx43xx (2025).
Compiled by L. J. Sun (FRIB, MSU), February 5, 2025.

2025Bu00: ^{31}Cl ions were produced by fragmentation of a 150 MeV/nucleon ^{36}Ar beam on a 1645 mg/cm^2 Be production target, separated and purified by the A1900 fragment separator and the Radio Frequency Fragment Separator (RFFS), and transported into the Gaseous Detector with Germanium Tagging (GADGET) system consisting a custom-built gas-filled proportional counter called Proton Detector (PD) surrounded by the SeGA array of 16 HPGe crystals. Measured center-of-mass energies and relative intensities of β-delayed protons, and pγ-coincidences. Normalized I_p relative to the I_p of the 1027-keV (c.m.) proton of 2011SaZM. Deduced excitation energies and I_β of proton-emitting states in ^{31}S.

^{31}S Levels

E(level)[†]	J^π[‡]	Comments
6388 *4*	$3/2^+$	%p=0.024*3* E(p)(cm)=258 keV *4*; %p: deduced based on measured β-delayed γ emissions I($\beta\gamma$)=0.0338 *18* from this level by 2018Be12 and β-delayed proton emission I(βp)=9.0×10^{-6} *10* from this level.
6936 *2*	$1/2^+,3/2^+,5/2^+$	E(level): From ^{31}S Adopted Levels in ENSDF database.
7037 *2*	$(5/2)^+$	E(level): From ^{31}S Adopted Levels in ENSDF database.
7157.5 *11*	$3/2^+,5/2^+$	E(level): From ^{31}S Adopted Levels in ENSDF database.
7703 *3*	$1/2^+,3/2^+,5/2^+$	
7797 *12*	$(1/2^+,3/2^+,5/2^+)$	
7887 *3*	$1/2^+,3/2^+,5/2^+$	
7905 *8*	$1/2^+$	
8017 *3*		
8024 *2*	$1/2^+,3/2^+,5/2^+$	
8275 *4*	$1/2^+,3/2^+,5/2^+$	
8418 *3*	$1/2^+,3/2^+,5/2^+$	
8557 *2*		
8669 *8*	$1/2^+,3/2^+,5/2^+$	
8709 *7*	$1/2^+,3/2^+,5/2^+$	
8813 *2*		
8950 *5*		
8964 *2*		
9238 *2*		
9328 *5*		
9404 *6*	$3/2^+,5/2^+$	
9421 *8*	$3/2^+,5/2^+$	

[†] from E_p(c.m.)+S(p)(^{31}S)+E(level)(^{30}P), where S(p)=6130.65 *24* (2021Wa16). Weighted average is taken where there are more than one proton decay branches from a level in ^{31}S.
[‡] From ^{31}S Adopted Levels in ENSDF database.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ [‡]	Iε[‡]	Log *ft*	I($\varepsilon+\beta^+$)[†‡]
(2587 *9*)	9421	0.007 *4*	1.3×10^{-4} *8*	4.7 *+4−2*	0.007 *4*
(2604 *7*)	9404	0.0030 *10*	5×10^{-5} *2*	5.1 *+2−1*	0.003 *1*
(2680 *6*)	9328	0.017 *5*	2.6×10^{-4} *8*	4.4 *+2−1*	0.017 *5*
(2770 *4*)	9238	0.016 *3*	2.1×10^{-4} *4*	4.6 *1*	0.016 *3*
(3044 *4*)	8964	0.009 *3*	8×10^{-5} *3*	5.1 *+2−1*	0.009 *3*

Continued on next page (footnotes at end of table)

^{31}Cl $\varepsilon+\beta^+$ decay:XUNDL-22 2025Bu00 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ ‡	Iε‡	Log *ft*	I($\varepsilon+\beta^+$)†‡
(3058 *6*)	8950	0.010 *8*	8×10^{-5} *7*	5.1 *+7–3*	0.010 *8*
(3195 *4*)	8813	0.019 *4*	1.3×10^{-4} *3*	4.9 *1*	0.019 *4*
(3299 *8*)	8709	0.0028 *8*	1.7×10^{-5} *5*	5.8 *+2–1*	0.0028 *8*
(3339 *9*)	8669	<0.0189	$<1.07\times10^{-4}$	>5.0	<0.019
(3451 *4*)	8557	0.015 *3*	7×10^{-5} *2*	5.2 *1*	0.015 *3*
(3590 *5*)	8418	0.090 *10*	3.7×10^{-4} *5*	4.54 *5*	0.09 *1*
(3733 *5*)	8275	<0.00797	$<2.81\times10^{-5}$	>5.7	<0.008
(3984 *4*)	8024	0.0034 *7*	9×10^{-6} *2*	6.2 *1*	0.0034 *7*
(3991 *5*)	8017	0.09 *2*	2.4×10^{-4} *6*	4.8 *1*	0.09 *2*
(4103 *9*)	7905	0.0026 *7*	6×10^{-6} *2*	6.4 *+2–1*	0.0026 *7*
(4121 *5*)	7887	0.038 *8*	9×10^{-5} *2*	5.3 *1*	0.038 *8*
(4211 *13*)	7797	$<4.99\times10^{-4}$	$<1.08\times10^{-6}$	>7.2	<0.0005
(4305 *5*)	7703	0.14 *3*	2.8×10^{-4} *6*	4.8 *1*	0.14 *3*
(4850.5 *34*)	7157.5	1.31 *2*	0.00165 *3*	4.15 *1*	1.31 *2*
(4971 *4*)	7037	0.090 *10*	1.0×10^{-4} *1*	5.38 *5*	0.09 *1*
(5072 *4*)	6936	0.20 *2*	2.1×10^{-4} *2*	5.08 *5*	0.20 *2*
(5620 *5*)	6388	3.38 *18*	0.00247 *14*	4.11 *+2–3*	3.38 *18*

† From I_p normalized relative to the I_p=0.131 *2* of the 1027-keV (c.m.) proton of 2011SaZM.

‡ Absolute intensity per 100 decays.