^{12}C(^{22}Ne,2pγ) 2023Wi06

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

Adapted from the XUNDL dataset for 2023Wi06, compiled by G. Gürdal (NNDC,BNL) on December 4, 2023.

2023Wi06: E=56.3 MeV ^{22}Ne beam was produced from the ISAC-II facility of TRIUMF. Target was a 500 μg/cm^2 self-supporting foil of natural carbon and another target with a 394 μg/cm^2 layer of ^{nat}C was used for lifetime measurements. γ-rays were detected using the TIGRESS array consisting of 14 segmented HPGe clovers and charged particles were detected using a 128-channel spherical CsI(Tl) array. Measured Eγ, $\gamma\gamma(\theta)$(DCO), γ(lin pol), Doppler-shift attenuation. Deduced levels, J, π, $T_{1/2}$, γ-ray multipolarities, transition strengths. Comparison with theoretical calculations.

^{32}Si Levels

E(level)[†][‡]	J$^\pi$[#]	$T_{1/2}$[@]	Comments
0	0$^+$[&]		
1942.19 *9*	2$^+$[&]	541 fs *83*	
5221.4 *10*	(1$^+$)[&]		
5287.4 *10*	3$^-$[&]	180 fs *62*	
5505.25 *17*	5$^-$	32.5 ns *4*	J$^\pi$: 3562.8γ E3, ΔJ=3 to 2$^+$. $T_{1/2}$: from 3562.84γ(t) of TIGRESS-CsI timing distribution (2023Wi06). Other: 30.5 ns *28* from $\gamma\gamma$(t) using 842.1γ and 3562.84γ. The authors of 2023Wi06 stated that the large uncertainty in $\gamma\gamma$(t) is due to the lower statistics.
5772.45 *42*	(3$^-$)[a]	28 fs *21*	
5881.4 *13*	4$^+$	12.5 fs *56*	J$^\pi$: 3938.9γ E2, ΔJ=2 to 2$^+$.
6347.36 *33*	(4$^-$)[a]	0.68 ps *10*	

[†] Additional information 1.
[‡] From a least-squares fit to γ-ray energies, assuming ΔEγ=1 keV where not given.
[#] As proposed in 2023Wi06 based on measured $\gamma\gamma$(DCO), γ(lin pol), and known assignments of low-lying states, unless otherwise stated.
[@] From DSAM with GEANT4 simulations in 2023Wi06, unless otherwise noted.
[&] From Adopted Levels.
[a] From shell-model predictions (2023We06).

γ(^{32}Si)

B(E2) and B(E3) values under comments are from 2023Wi06.

E$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
(217)	5505.25	5$^-$	5287.4	3$^-$	[E2]	E$_\gamma$: not observed; from level-energy difference. B(E2)(W.u.)<0.053, from intensity limit of unobserved transition (2023Wi06).
574.9 *3*	6347.36	(4$^-$)	5772.45	(3$^-$)		
842.1 *3*	6347.36	(4$^-$)	5505.25	5$^-$		
1942.13 *9*	1942.19	2$^+$	0	0$^+$	[E2]	B(E2)(W.u.)=6.3 *+11−8*.
3279	5221.4	(1$^+$)	1942.19	2$^+$		
3345	5287.4	3$^-$	1942.19	2$^+$		
3562.84 *14*	5505.25	5$^-$	1942.19	2$^+$	E3	R_{DCO}=1.06 *4*, Δ_{asym}=+0.032 *13*. B(E3)(W.u.)=0.0841 *10*.
3830	5772.45	(3$^-$)	1942.19	2$^+$		
3938.9 *13*	5881.4	4$^+$	1942.19	2$^+$	E2	R_{DCO}=1.00 *9*, Δ_{asym}=+0.07 *3*. B(E2)(W.u.)=8 *+7−3*.

Continued on next page (footnotes at end of table)

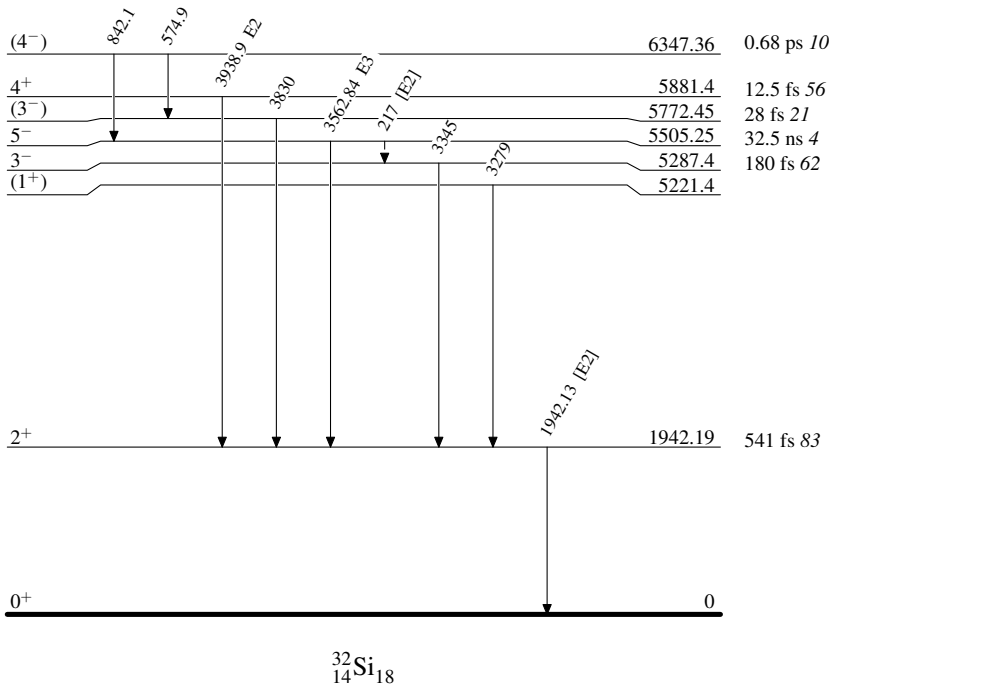
$^{12}C(^{22}Ne,2p\gamma)$ 2023Wi06 (continued)

$\gamma(^{32}Si)$ (continued)

† From 2023Wi06.
‡ From the R_{DCO}, Δ_{asym} and the decay pattern in 2023Wi06. Expected R_{DCO} values are ≈0.5 for stretched dipole transitions and ≈1.0 for stretched quadrupole or octupole transitions when gating on a coincident stretched quadurpole transition. Positive polarization asymmetry Δ_{asym} indicates electric nature and negative value for magnetic nature of a transition.

$^{12}C(^{22}Ne,2p\gamma)$ 2023Wi06

Level Scheme



$^{32}_{14}Si_{18}$