

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia [#] , A. Chakraborty ^{##}		NDS 171, 1 (2021)	1-Jun-2020

$Q(\beta^-)=4375.80$ 10; $S(n)=5200.65$ 10; $S(p)=15236$ 12; $Q(\alpha)=-10911.8$ 26 [2017Wa10](#)

Other reaction:

[1979Gr16](#): $^{27}\text{Al}(\alpha, ^8\text{Be})$, $E=109$ MeV, first observation of the $(\alpha, ^8\text{Be})$ reaction.

[2018MuZY](#) list 23 resonance levels for ^{23}Ne .

 ^{23}Ne LevelsCross Reference (XREF) Flags

A	^{23}F β^- decay	E	$^{22}\text{Ne}(n,n),(n,\gamma)$:res	I	$^{23}\text{Na}(n,p)$
B	$^{21}\text{Ne}(t,p)$	F	$^{22}\text{Ne}(d,p\gamma)$	J	$^{23}\text{Na}(n,p\gamma)$
C	$^{22}\text{Ne}(n,\gamma)$ $E=\text{thermal}$	G	$^{22}\text{Ne}(d,p),(p,d,p)$	K	$^{208}\text{Pb}(^{22}\text{Ne}, ^{23}\text{Ne}\gamma)$
D	$^{22}\text{Ne}(n,\gamma)$ $E=15\text{-}60$ keV	H	$^{23}\text{Na}(\mu^-, \gamma)$		

E(level) [†]	J^π	$T_{1/2}$ ^{&}	XREF	Comments
0.0	$5/2^+$	37.25 s 10	ABCD FGHIJK	$\% \beta^- = 100$ $\mu = -1.0794$ 10; $Q = 0.145$ 13 $\delta < r^2 > (^{20}\text{Ne}, ^{23}\text{Ne}) = -0.572$ fm ² 34 (2013An02 , 2011Ma48). The r.m.s. charge radius $< r^2 >^{1/2} = 2.910$ fm 7 (2013An02). J^π : $5/2$ from LASER spectroscopy (2005Ge06 , 2013Ma15), $L=2$ in (d,p). $T_{1/2}$: From 37.151 s 56 (wt. ave. of 37.126 s 30 and 37.276 s 67 with external uncertainty (2015La19 – also 37.153 s 28 with statistical uncertainty)), 37.11 s 6 (from 2007Gr18), 37.24 s 12 (from 1974Al03), 37.6 s 1 (1957Pe12), 38.0 s 3 (1958Nu41), and 37.5 s 1 (1959Al10) – using the Limitation of Relative Statistical Weight (LWM) method (1985ZiZY). Wt. ave. 37.25 s 9 with $\chi^2=6.7$ and $\chi^2_{\text{crit}}=3.0$ at 99% C.L. Unweighted ave. 37.43 s 14. Other values (outlier – Chauvenet's criterion): 38.7 s 4 (1967Yu01), 40.2 s 4 (1950Br78). μ : From 2019StZV (in 1994Hi09 -1.0795 10 β -NMR). Others: -1.077 4 (2005Ge06 – CFBLs/ β -NMR), -1.08 1 (1968Do07), 1.0817 9 (2014StZZ). Q : From 2005Ge06 , 2016St14 – CFBLs/ β -NMR. J^π : $L=0$ in (d,p). $T_{1/2}$: from 1966Fo02 (d,p γ) – p γ (t) coincidence. Other: 208 ps 110 (d,p γ) (1974Ch35). J^π : From $\gamma(\theta)$ in 1969Na02 (n,p γ), D(+Q) γ to $5/2^+$, γ from $3/2^+$ and $5/2^+$. J^π : $L=0+2$ in (t,p) from a $3/2^+$ g.s. J^π : $L=2$ in (d,p). J^π : From $\gamma(\theta)$ in 1969Na02 (n,p γ), $\log ft=6.1$ from $5/2^+$. J^π : $L=1$ in (d,p) and $\neq 1/2$ from $\gamma(\theta)$ and correlation studies (1967Ho08 – (d,p γ)). J^π : $L=2$ in (d,p). J^π : γ 's to $1/2^+$ and $3/2^+$. J^π : $\log ft=4.6$ from $5/2^+$. J^π : $L=1$ in (d,p). J^π : $L=2$ in (d,p).
1016.926 20	$1/2^+$	178 ps 10	ABCD FGHIJK	
1701.59 17	$(7/2^+)$	<70 fs	AB FGH J	
1822.26 6	$3/2^+$	<70 fs	ABCD FGHIJ	
2315.1 3	$5/2^+$ @	<70 fs	AB FGHIJ	
2516.8 3	$(5/2, 7/2)$	<70 fs	AB FG J	
3220.69 5	$3/2^-$	<70 fs	BCD FG	
3431.6 3	$3/2^+$ @	<70 fs	Ab FGH	
3458.49 8	$(1/2, 3/2, 5/2^+)$	<70 fs	bC F H	
3830.9 4	$(3/2, 5/2, 7/2)^+$	<70 fs	Ab F	
3836.35 6	$1/2^-$ @	<70 fs	bCD FG	
3842.3 9		<70 fs	b F	
3987.8 5	$(3/2)^+$ @	<70 fs	b FG	
4010 3		<70 fs	b F	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{23}Ne Levels (continued)

E(level) [†]	J ^π	XREF		Comments
4270 15		B	G	
4436.1 4	(3/2 ⁺ ,5/2 ⁺ ,7/2 ⁺) ⁺	AB	G	J ^π : log ft=4.7 from 5/2 ⁺ .
4764 5		B	G	
4867 15		B	G	
4940 5			G	
4995 15		b	G	
5029 5		b	G	
5068 5			G	
5185 6	(3/2 ⁺ ,5/2 ⁺)	b	G	J ^π : L=(2) in (d,p).
5200.71 6	1/2 ⁺	bCD		J ^π : Capture-state spin, assuming s-capture.
(5220 5)	5/2 ⁻ ,7/2 ⁻	b	G	J ^π : L=3 in (d,p).
5265?			G	
5340?		B	G	XREF: B(5366).
5460.8 [‡] 3	1/2 ⁻		E G	J ^π : From $^{22}\text{Ne}(n,\gamma)$ resonance data.
5478.7 [‡] 3	1/2 ⁺	B	E	J ^π : From $^{22}\text{Ne}(n,\gamma)$ resonance data.
5522 10			G	
5560 15			G	
5609.2 [‡] 5	1/2 ⁻		E G	J ^π : From $^{22}\text{Ne}(n,\gamma)$ resonance data.
5646 [#] 10		B	G	
5672 5	1/2 ⁺		E	J ^π : From $^{22}\text{Ne}(n,\gamma)$ resonance data.
5726 10			G	
5740.2 [‡] 6	3/2 ⁺	B	E	J ^π : L=0 in (t,p).
5785 15			G	
5861.0 [‡] 7	3/2 ⁻		E G	XREF: G(5840).
				J ^π : From $^{22}\text{Ne}(n,\gamma)$ resonance data.
5899 40		B		
5968 5	1/2 ⁺		E	J ^π : From $^{22}\text{Ne}(n,\gamma)$ resonance data.
6093 40		B		
6329? 40		B		
6445 40		B		

[†] From least-squares fit to γ -ray energies, except otherwise noted.[‡] From (n,n),(n, γ):res.[#] From (d,p),(pol d,p).[@] From (pol d,p) – vector analyzing power – 1974WoZA.[&] From (d,p γ), except otherwise noted. $\gamma(^{23}\text{Ne})$

E _i (level)	J _i ^π	E _{γ} [†]	I _{γ} [†]	E _f	J _f ^π	Mult.	δ	Comments
1016.926	1/2 ⁺	1016.90 2	100	0.0	5/2 ⁺	[E2]		B(E2)(W.u.)=0.75 5
1701.59	(7/2 ⁺)	1701.51 18	100	0.0	5/2 ⁺	D(+Q)	+0.11 12	E _{γ} , δ : From 1969Na02 (n,p γ).
1822.26	3/2 ⁺	1822.22 8	100	0.0	5/2 ⁺			E _{γ} : Weighted average of 1822.25 21 (^{23}F β^- decay), 1822.19 6 (n, γ), and 1822.8 3 (d,p γ).
2315.1	5/2 ⁺	492.6 [#] 4	89 [‡] 4	1822.26	3/2 ⁺			
		614.0 [‡] 15	6.9 [‡] 23	1701.59	(7/2 ⁺)			
		1298.2 [‡] 9	17 [‡] 4	1016.926	1/2 ⁺			
		2315.0 [#] 5	100 [‡] 4	0.0	5/2 ⁺			

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{23}\text{Ne})$ (continued)						
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Comments
2516.8	(5/2,7/2)	815.3 [#] 4	100 [‡] 11	1701.59	(7/2 ⁺)	
		2516.6 [#] 5	44 [‡] 18	0.0	5/2 ⁺	
3220.69	3/2 ⁻	1398.45 6	1.91 9	1822.26	3/2 ⁺	I_γ : Other: 12 4 (^{23}F β^- decay).
		2203.62 7	100.0 9	1016.926	1/2 ⁺	I_γ : 3.2 11 in (d,p γ).
		3220.39 12	19.6 3	0.0	5/2 ⁺	
3431.6	3/2 ⁺	1116.5 [‡] 6	6.1 [‡] 15	2315.1	5/2 ⁺	
		1608.8 [‡] 11	13 [‡] 3	1822.26	3/2 ⁺	
		2414.5 [#] 5	39 [‡] 6	1016.926	1/2 ⁺	
		3431.5 [#] 4	100 [‡] 7	0.0	5/2 ⁺	
3458.49	(1/2,3/2,5/2 ⁺)	1636.05 10	100 8	1822.26	3/2 ⁺	
		2441.52 29	40 8	1016.926	1/2 ⁺	I_γ : Other: 82 15 (d,p γ).
3830.9	(3/2,5/2,7/2) ⁺	2128.7 [#] 7	100 [@] 16	1701.59	(7/2 ⁺)	
		3830.7 [#] 4	10 [‡] 1	0.0	5/2 ⁺	
3836.35	1/2 ⁻	377.64 16	0.8 2	3458.49	(1/2,3/2,5/2 ⁺)	
		615.81 13	4 1	3220.69	3/2 ⁻	
		2014.03 7	96 1	1822.26	3/2 ⁺	
		2819.27 12	100 3	1016.926	1/2 ⁺	
3842.3		1325.5 [‡] 8	100	2516.8	(5/2,7/2)	
3987.8	(3/2) ⁺	1672.6 4	72 [‡] 5	2315.1	5/2 ⁺	
		3988.9 16	100 [‡] 10	0.0	5/2 ⁺	
4010		4010 [‡] 3	100	0.0	5/2 ⁺	
4436.1	(3/2,5/2,7/2) ⁺	1919.3 [@] 5	100 [@] 13	2516.8	(5/2,7/2)	
		2734.2 [@] 5	62 [@] 8	1701.59	(7/2 ⁺)	
5200.71	1/2 ⁺	1364.34 4	25.0 3	3836.35	1/2 ⁻	
		1742.13 10	1.4 1	3458.49	(1/2,3/2,5/2 ⁺)	
		1979.92 6	100 1	3220.69	3/2 ⁻	
		3377.98 18	2.0 1	1822.26	3/2 ⁺	
		4183.32 18	4.1 2	1016.926	1/2 ⁺	
		5201		0.0	5/2 ⁺	

[†] From (n, γ) E=Thermal, except otherwise noted.[‡] From (d,p γ).[#] Weighted average of data from ^{23}F β^- decay and (d,p γ).[@] From ^{23}F β^- decay.

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

