

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 127, 69(2015)	1-Apr-2015

$Q(\beta^-) = -2843.20$ 17; $S(n) = 10364.26$ 4; $S(p) = 15266.1$ 18; $Q(\alpha) = -9666.81$ 2 [2012Wa38](#)

[2006As01](#): No evidence of excited state population in ^{22}Ne from $^9\text{Be}(^{18}\text{O}, \alpha^{14}\text{C})$, $(^{18}\text{O}, ^{10}\text{Be}^{12}\text{C})$, and $(^{18}\text{O}, ^9\text{Be}^{13}\text{C})$ reactions.

Other reaction: $^{22}\text{Ne}(\alpha, \alpha')$: [1971OI01](#), [1984Sa28](#), [1987Su09](#).

 ^{22}Ne LevelsCross Reference (XREF) Flags

A	$^{22}\text{F} \beta^-$ decay	J	$^{18}\text{O}(^6\text{Li}, d)$	S	$^{22}\text{Ne}(e, e')$
B	$^{22}\text{Na} \varepsilon$ decay	K	$^{18}\text{O}(^7\text{Li}, t), (^7\text{Li}, t\gamma)$	T	$^{22}\text{Ne}(p, p')$
C	$^4\text{He}(^{19}\text{F}, p\gamma)$	L	$^{19}\text{F}(\alpha, p\gamma)$	U	Coulomb excitation
D	$^{11}\text{B}(^{13}\text{C}, d)$	M	$^{20}\text{Ne}(t, p)$	V	$^{23}\text{Na}(d, ^3\text{He})$
E	$^{12}\text{C}(^{18}\text{O}, ^8\text{Be}), ^{14}\text{C}(^{18}\text{O}, ^{10}\text{Be})$	N	$^{20}\text{Ne}(t, p\gamma)$	W	$^{23}\text{Na}(t, \alpha)$
F	$^{14}\text{C}(^{12}\text{C}, \alpha)$	O	$^{21}\text{Ne}(n, \gamma)$ E=thermal	X	$^{26}\text{Mg}(d, ^6\text{Li})$
G	$^{18}\text{O}(\alpha, \gamma)$	P	$^{21}\text{Ne}(n, \gamma)$: res	Y	$^{26}\text{Mg}(^3\text{He}, ^7\text{Be})$
H	$^{18}\text{O}(\alpha, n)$: res	Q	$^{21}\text{Ne}(d, p)$	Z	$^{150}\text{Nd}(^{26}\text{Mg}, ^{22}\text{Ne}\gamma)$
I	$^{18}\text{O}(^4\text{He}, ^4\text{He}')$: res	R	$^{22}\text{Ne}(\gamma, \gamma')$		

E(level) [†]	J ^π	T _{1/2} ^g	XREF	Comments
0.0 ^c	0 ⁺ ^{cf}	stable	ABCD GH JKLMN OPQR STUV WXYZ	$\delta \langle r^2 \rangle(^{20}\text{Ne}, ^{22}\text{Ne}) = -0.321 \text{ fm}^2$ 4 (stat) 43 (syst) (2011Ma48 , 2008Ge07). Absolute ^{22}Ne charge radius = 2.952 fm 9 (2008Ge07) deduced with respect to known ^{20}Ne charge radius = 3.006 fm 5. J ^π : From optical spectroscopy (1927Ha01); L=0 in ($^6\text{Li}, d$), ($^7\text{Li}, t$), and (t, p); natural parity.
1274.537 ^c 7	2 ⁺ ^{cf}	3.60 ps 5	AB D G JKLMN OPQ S UVWXYZ	$\mu = +0.65$ 2; $Q = -0.19$ 4 E(level): From γ -ray energy. J ^π : E2 to 0 ⁺ ; L=2 in ($^6\text{Li}, d$), ($^7\text{Li}, t$), and (t, p); natural parity. μ : Recoil into Vacuum, Differential method (1977Ho01 , 2014StZZ). Q: Coulomb Excitation Reorientation (1981Sp07 , 2014StZZ). T _{1/2} : From mean lifetime 5.19 ps 7: weighted average of mean lifetimes – 5.16 ps 13 (1984Bh03), 5.1 ps 2 (1983Ko01), 4.6 ps 6 (1979Ma13), 5.15 ps 31 (1979Fo02), 5.2 ps 3 (1977Ho01), 5.62 ps 20 (1977Ra01), 4.9 ps 7 (1977Og03), 5.15 ps 14 (1977Sc36), 4.9 ps 4 (1974OI01), 5.4 ps 4 (1973An01), 5.5 ps 10 (1973Si31), 5.9 ps 11 (1972Sn01), 5.9 ps 6 (1972Sz05), 3.6 ps 7 (1970Na07), 4.6 ps 5 (1969Jo10), 6.1 ps 5 (1969ScZV), and 3.1 ps 11 (1960An07).
3357.2 ^{‡c} 5	4 ⁺ ^{cf}	225 fs 4	A D G JKLMN Q S VWXYZ	$\mu = +2.2$ 6 J ^π : L=4 in ($^6\text{Li}, d$); natural parity. μ : Tilted Foil hyperfine field integral perturbed angular

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Adopted Levels, Gammas (continued) ^{22}Ne Levels (continued)

E(level) [†]	J ^π	T _{1/2} ^g	XREF								Comments
4456.2 9	2 ⁺ ^f	3.7 ⁱ fs 25	A	CD	G	JKLMN	Q	S	VWXYZ		correlation (1984Ba10, 2014StZZ). T _{1/2} : From mean lifetime 324 fs 6: weighted average of mean lifetimes – 324 fs 9 (1979Fo02), 311 fs 17 (1978Fi04), 328 fs 10 (1978Ek01), 285 fs 50 (1974Fi16), 360 fs 50 (1972Br17 – average of measurements with 39 different slowing down materials), 270 fs 90 (1968Ku05), 400 fs 110 (1967Wa13), and 390 fs 80 (1964Es02). J ^π : E2 to 0 ⁺ ; L=2 in (⁶ Li,d), (⁷ Li,t), and L=(2) in (t,p); natural parity. T _{1/2} : From (e,e') – 1979Ma13. Other values: <11 fs (1979Al01 – (¹⁹ F,py)), <30 (α,py), while 37 fs 6 (1993Ol05 – (α,py)) is higher compared to other values.
5146.0 9	2 ⁻ ^f	0.8 ps 2	CD	G		KL MN	Q		VW X		J ^π : E1 to 2 ⁺ , L=1,3 in (t,p); unnatural parity. T _{1/2} : From mean lifetime 1.1 ps 2: weighted average of mean lifetimes – 1.2 ps 3 (1975Me19), 1.15 ps 45 (1976Fi02), 1.3 ps 5 (1979Al01), and 0.9 ps 4 (1993Ol05).
5329.6 13	1 ⁺ ^f	1.2 fs 3	D	G		L N	QRS		W		E(level): Weighted average of data from (e,e'), (γ,γ'), and (α,py). J ^π : M1+E2 to 2 ⁺ , J ^π =1 ⁺ in (e,e') (1974Ma43); (unnatural parity). T _{1/2} : From mean lifetime 1.7 ps 3: Weighted average of 1.7 fs 3 (e,e') (1979Ma13) and 1.8 fs 7 (γ,γ') (1984Be26).
5363.4 11	2 ⁺ ^f	69 ⁱ fs 12	D			JKLMN	Q		WX		J ^π : E2 to 0 ⁺ ; L=2 in (t,p); natural parity. T _{1/2} : <20 fs in 1976Fi02 – reason for this discrepancy is unknown.
5523.3 [‡] 6	(4) ⁺ ^f	21 fs 3	A	CD		JKLMN	Q		WX Z		J ^π : L=4 in (⁶ Li,d), (t,p); natural parity; J=3 in ¹¹ B(¹³ C,d). T _{1/2} : From mean lifetime 30 fs 4: Weighted average of 27 fs 4 (1979Al01) and 37 fs 6 (1993Ol05). Uncertainty – lower experimental value.
5641.2 [‡] 7	3 ⁺ ^f	<3 ⁱ fs	A	CD		KL MN	Q		WX		J ^π : M1 to 2 ⁺ ; L=2 in (d,p); unnatural parity.
5910.1 9	3 ⁻ ^f	32 fs 11	A	D		JKLMN		S	WX		E(level): From (n,γ). J ^π : E1 to 2 ⁺ ; L=3 in (⁶ Li,d); natural parity; γ to 4 ⁺ . T _{1/2} : From mean lifetime 46 fs 16: Weighted average of 51 fs 23 (1976Fi02) and 44 fs 16 (1993Ol05). Uncertainty – lower experimental value.
6119.9 16	2 ⁺ ^f	14 fs 7	D			JKLMN	Q	S	WX		J ^π : L=2 in (t,p); natural parity. T _{1/2} : From (e,e'). Other value: 24 fs 9 (1993Ol05).
6235 2	0 ⁺ ^f	236 ⁱ fs 83				JKLM		S	X		J ^π : L=0 in (⁶ Li,d), (⁷ Li,t), and (t,p); natural parity.
6311.0 ^c 10	(6 ⁺) ^c	49 fs 4	CD	G		L			W Z		T _{1/2} : From mean lifetime 70 fs 6: Weighted average of 78 fs 15 (1976Fi02), 70 fs 10 (1979Al01), and 69 fs 6 (1993Ol05). Uncertainty – lowest experimental value.
6345.1 [‡] 10	4 ⁺ ^f	13 ⁱ fs 3	A	CD	G	KL MN	Q		WX		J ^π : L=4 in (t,p), natural parity.
6635.8 8	(3,4) ⁺	49 ⁱ fs 21	CD			LM	Q		WX		J ^π : M1+E2 to 4 ⁺ , γ to 2 ⁺ , L=2 in (d,p).
6689.0 11	1 ⁻ ^f	243 ⁱ fs 132				KLM		S	WX		J ^π : L=1 in (t,p); natural parity.
6819.4 16	2 ⁺	<3 ⁱ fs	CD			KLM	Q	S	WX		J ^π : L=2 in (t,p), (⁷ Li,t); natural parity.
6853.5 16	(1 ⁺)	0.38 [#] fs 16	D	G		LM	QRST		W		J ^π : M1 to 0 ⁺ and 2 ⁺ , also from σ(θ) and DWIA calculation in (p,p').

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Adopted Levels, Gammas (continued) ^{22}Ne Levels (continued)

E(level) [†]	J ^π	T _{1/2} ^g	XREF			Comments
6900 2	0 ⁺	76 ⁱ fs 8		KLM	S W	J ^π : L=0 in (⁷ Li,t).
7051 3	1 ^{-f}	100 ⁱ fs 30	D	KLMN	Q S W	J ^π : L=1 in (t,p); natural parity.
7341.1 11	0 ⁺ ^f	<3 ⁱ fs	D	JKL N	Q WX Z	J ^π : L=0 in (⁷ Li,t), (⁶ Li,d) for doublet; natural parity for doublet. γ-rays to 1 ⁺ and 2 ⁺ .
7341.2 [‡] 11	(4) ⁺ ^f	35 ⁱ fs 21	A D	LM		J ^π : L=(4) in (t,p); natural parity.
7405.9 7	(3) ^{-f}	32 ⁱ fs 10	D	KLM	Q WX	J ^π : L=1 in (d,p), E1 to 2 ⁺ (α,py), γ-ray feeding from 4 ⁺ state at 8855; natural parity for doublet. Another possibility 1 ⁻ , as suggested in 1993OI05 – (α,py), less likely considering γ feeding from 4 ⁺ .
7423.0 [‡] 9	(5 ⁺)	<3 ⁱ fs	A D	LM	W Z	J ^π : From (α,py) (1993OI05), based on γ(θ) and Hauser-Feshbach calculations.
7469? 2	1,2	55 ⁱ fs 21		L	Q S W	J ^π : From (α,py). 1559γ to 3 ⁻ .
7489 5	1 ^{-f}		G	KLMN	W	J ^π : L=1 in (⁷ Li,t) and (t,p); natural parity.
7643.1 13	2 ⁺	470 ^k as 200	D	JKLM	Q S X	J ^π : L=2 in (⁷ Li,t); 7641γ E2 to 0 ⁺ .
7663.7 9	(2) ⁻			LM	Q S	XREF: S(7630). J ^π : L=1 in (d,p); also from (e,e').
7722.0 11	3 ^{-f}		D	JKLM	Q X	J ^π : L=3 (⁶ Li,d), (⁷ Li,t), and (t,p); natural parity.
7921 2	(2) ⁺ ^f		D	KLM	Q S X	J ^π : L=2 in (t,p); natural parity. J=3 in (¹³ C,d).
8076.9 14	(4) ⁺		D	KLM	Q	J ^π : L=2 in (d,p); J=3 in (¹³ C,d); γ-ray transitions to 2 ⁺ , 4 ⁺ , (6 ⁺).
8134.3 4	2 ⁺ ^f		D	JKLM	Q X	J ^π : L=2 in (t,p); natural parity.
8162.2 13	2 ⁺ , 3, 4 ⁺			LM	S	J ^π : γ's to 2 ⁺ and 4 ⁺ .
8375.9 16	(3) ⁻		D	KLM	Q X	J ^π : L=3 in (t,p); natural parity; γ transitions to 2 ⁺ , 4 ⁺ . But J=5 in (¹³ C,d).
8452 7					X	
8489.6 12	2 ⁺		D	KLM	Q	XREF: M(8500). J ^π : L=2 in (t,p).
8561.4 [#] 19	(1,2) ⁺	0.35 [#] fs 13		LM	QR	J ^π : L=2 in (d,p), γ to 0 ⁺ and 1 ⁻ .
8573 10					X	
8596.0 9			D	KLM	Q S	
8741.0 14	(3) ⁻		D	LM	Q X	J ^π : L=3 in (t,p); but J=5 in (¹³ C,d).
8855.3 15	(4) ⁺			LM	Q	J ^π : L=2 in (d,p); γ transitions to (3) ⁻ , (6) ⁺ .
8900.3 16			D G	L	Q T	J ^π : Reported as doublet of 1 ⁻ and (4,5) ⁺ in 1998En04.
8976 3			D	J LM		
9045 3	(2 ⁺ , 3 ⁻)			LM	Q X	J ^π : γ's to 4 ⁺ , 1 ⁻ .
9097 3	(1 to 3) ⁻		D	J LM	Q	J ^π : L=1 in (d,p); possible γ-ray branch to 2 ⁺ (1976Fi02).
9178 3	1 ⁺	84 [#] as 3			RS	XREF: S(9140). E(level): Other values: 9165 3 (1979Be10 – (γ,γ')), 9170 4 (1976Fi02 – (α,py)), 9179 10 (1974Fi07 – (t,p)). J ^π : From (pol γ,γ').
9178.1 7	(4) ⁺		D	J LM	T	J ^π : L=4 in (t,p); but J=5 in (¹³ C,d).
9229 3	2 ⁺			J LM	X	J ^π : L=2 in (t,p); γ transitions to 1 ⁻ , 2 ⁻ states.
9250 3				L		
9324 2			D	L		
9508 [@] 10			D	J LM		
9541 10	2 ⁺			M		J ^π : L=2 in (t,p).
9625 12	5		D	J L		XREF: D(9640)L(9609). E(level): Average of data from (α,py), (⁶ Li,d), and (¹³ C,d).

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Adopted Levels, Gammas (continued) ^{22}Ne Levels (continued)

E(level) [†]	J ^π	T _{1/2} ^g	XREF		Comments
9654 10			D	M	J ^π : From (α,py) (1976Br06). XREF: D(9630).
9725 & 10	(3 ⁻)		J	LM	XREF: L(9697). J ^π : L=(3) in (⁷ Li,t).
9841 @ 10	(2 ⁺)		J	LM	J ^π : L=(2) in (⁷ Li,t).
10066 & 10	(0 ⁺)		J	M	J ^π : L=(0) in (⁷ Li,t).
10137 & 10	2 ⁺		J	LM	J ^π : L=2 in (t,p).
10208.5 ^a 10	1 ⁻	<2 ^a keV	G	J LM	J ^π : L=1 in (⁶ Li,d), γ to 0 ⁺ .
10280.4 ^a 10	(0 ⁺ , 1 ⁻ , 2 ⁺)	<2 ^a keV	G	J L	J ^π : From (α,γ) angular distributions.
10294.8 ^a 10	(2 ⁺)	<2 ^a keV	G	M	J ^π : Suggested in 1994Gi01, 9018γ D to 2 ⁺ .
10384 15			J	LM O	E(level): From (t,p). J ^π : 6,8 in (α,py).
10416.4 3			J	LM P	E(level): From (n,γ): res. J ^π : 6,8 in (α,py).
10462.5 5	3 ⁻		M	P	E(level): From (n,γ): res. J ^π : L=3 in (t,p).
10501.6 3	2 ⁺		M	P	E(level): From (n,γ): res. J ^π : L=2 in (t,p).
10544.9 4	2 ⁺		M	P	E(level): From (n,γ): res. J ^π : L=2 in (t,p).
10616 ^b 3	(5 ⁻)	6 keV	GH J	LM	J ^π : From αγ angular distribution measurements (α,γ).
10696 4		<4 ^a keV	G	J	E(level): From (α,γ).
10706 6		<10 ^a keV	GH	M	XREF: M(10720). E(level): From (α,γ).
10749 3	5 ⁻	6 keV	GH	L	E(level): From (α,n). J ^π : From (α,γ). Natural parity listed in 1990En08 Table 22.11.
10857 ^b 3	3 ⁻	6 keV	GH J	M	J ^π : L=3 in (t,p).
10890 10	1 ⁺				J ^π : From σ(θ) and DWIA calculation in (p,p').
10921 ^b 3	1 ⁻	24 keV	GH	M	J ^π : L=1 in (t,p); γ transitions to 0 ⁺ , 2 ⁺ states.
11032 ^a 6	(8 ⁺ , 6 ⁺)	<10 ^a keV	GH J	L	J ^π : 8 ⁺ in (α,py), (8 ⁺ , 6 ⁺) in (α,γ).
11064 10	2 ⁺			M	J ^π : L=2 in (t,p).
11130 ^a 5	6,7	<5 ^a keV	G	J L	J ^π : From (α,py), angular correlation measurements.
11172			H		
11194 ^b 3		7 keV	GH	M	
11269 ^b 5	2 ⁺ , 3 ⁺ , 4 ⁺	12 keV	GH J	M	J ^π : From 1978Tr05 (α,γ) – based on αγ angular distribution measurements.
11323			H		
11431 ^b 8		48 keV	GH	M	J ^π : Natural parity in 1978Tr05 (α,γ).
11465 ^b 3	(1 ⁻)	<3 keV	GH		J ^π : From 1978Tr05, 1970Ch18 (α,γ).
11522 8	7 ⁻		GH	LM	E(level): Weighted average of data 11533 10 (1994Ma37) and 11520 15 (1974F107) in (t,p), and 11482 20 (α,py).
					J ^π : From (α,py), angular correlation measurements. Natural parity listed in 1990En08 – Table 22.11.
11577 5		18 keV	GH	M	E(level): From (α,n).
11656 10				M	
11686 5	(2 ⁺)	9 keV	GH		E(level), J ^π : From (α,γ).
11708 15	(2 ⁺) ^d	5 ^d keV	HI	M	E(level): From (t,p).
11745		41 keV	G		

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Adopted Levels, Gammas (continued) ^{22}Ne Levels (continued)

E(level) [†]	J ^π	T _{1/2} ^g	XREF				Comments
11751	1 ⁻	8 keV	G				
11772 @ 10	3 ⁻		I	M			J ^π : L=3 in (t,p). Inconsistent with 1 ⁻ in (⁴ He, ⁴ He').
11892 6	1	10 ^d keV	G I	M	ST		E(level): Weighted average of data from 11886 10 (α,γ), 11907 10 and 11895 15 (t,p), and 11880 10 (⁴ He, ⁴ He').
							J ^π : 1 ⁺ in (p,p'), 1 ⁻ in (⁴ He, ⁴ He') and (α,γ).
12000 10	1 ⁺					T	
12020 10	0 ⁺ ^d	68 ^d keV	I				
12071 15				M			
12218 15				M			
12250 10	0 ⁺ ^d	76 ^d keV	I				
12280 10	1 ⁻ ^d	51 ^d keV	G I				
12390 10	3 ⁻	99 ^d keV	I	M			J ^π : L=3 in (t,p), Inconsistent with 2 ⁺ in (⁴ He, ⁴ He').
12450 20	(0 ⁺ ,1 ⁻)			M			J ^π : L=0,1 in (t,p).
12570 10	(1 ⁻) ^d	105 ^d keV	I		S		
12610 10	(2 ⁺) ^d	124 ^d keV	I				
12643 15				M			
12700 10	3 ⁻ ^d	15 ^d keV	I				
12800 10	2 ⁺ ^d	50 ^d keV	I				
12820 10	1 ⁻ ^d	170 ^d keV	I				
12862 15	(3 ⁻)	145 ^j keV	I	M			XREF: I(12840).
							J ^π : L=(3) in (t,p). J ^π =1 ⁻ in (⁴ He, ⁴ He'):res.
12900 10	3 ⁻ ^d	39 ^d keV	I	M			E(level): Average of data from (t,p) and (⁴ He, ⁴ He').
12990 10	0 ⁺ ^d	80 ^d keV	I				
13030 10	2 ⁺ ^d	90 ^d keV	I				
13078 20				M			
13190 10	3 ⁻ ^d	79 ^d keV	I				
13210 10	0 ⁺ ^d	81 ^d keV	I				
13274 20				M			
13392 8	3 ⁻ ^d	58 ^d keV	I	M			E(level): Average of data from (t,p) and (⁴ He, ⁴ He').
13460 10						T	
13490 10	4 ⁺ ^d	29 ^d keV	I				
13540 10	0 ⁺ ^d	96 ^d keV	I				
13570 10	3 ⁻ ^d	136 ^d keV	I				
13650 10	(3 ⁻) ^d	48 ^d keV	I				
13670 10	(2 ⁺) ^d	41 ^d keV	I				
13690 10	(5 ⁻) ^d	50 ^d keV	I				
13730 10	4 ⁺ ^d	57 ^d keV	I				
13820 10	(2 ⁺) ^d	51 ^d keV	I				
13880 10	4 ⁺ ^d	46 ^d keV	I			T	XREF: T(13890).
14060 20						T	
14470			E				
15580 40						T	
16510 10						T	
17.00×10 ³ 10			F				
17.48×10 ³ 10			E				
18.43×10 ³ 10		≈330 ^h keV	EF				E(level): Average of data from (¹⁸ O, ⁸ Be), ¹⁴ C(¹⁸ O, ¹⁰ Be) and (¹² C,α).
19280 20	(7 ⁻) ^d	88 ^d keV	F I				XREF: F(19130).

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Adopted Levels, Gammas (continued) ^{22}Ne Levels (continued)

E(level) [†]	J^π	$T_{1/2}^g$	XREF		Comments
19.45×10 ³ 10	(6 ⁺)		E		J^π : Based on α - α angular distribution measurements (2006Yi01).
19560 20	(7 ⁻) ^d	75 ^d keV	I		
19.89×10 ³ 10	(10 ⁺)		E		J^π : Based on α - α angular distribution measurements (2006Yi01).
20.00×10 ³ 10	(9 ⁻) ^e	≈270 keV	F		
20.70×10 ³ 10	(11 ⁻) ^d	≈340 ^d keV	F		
20850 20	(9 ⁻) ^d	110 ^d keV	I		
21840 20	(9 ⁻) ^d	170 ^d keV	EF I		XREF: F(21600). E(level): From (⁴ He, ⁴ He'):res. Γ – Other value: ~ 350 keV (¹² C, α).
22.20×10 ³ 10	(12 ⁺) ^e	≈250 ^h keV	F		
22.90×10 ³ 10		≈290 ^h keV	F		
24.14×10 ³ 20			F I		XREF: F(24000).
25.00×10 ³ 10	(9 ⁻) ^e	≈350 ^h keV	F		
25.90×10 ³ 10			F		
26.89×10 ³ 20			F I		XREF: F(27000).

[†] From ¹⁹F(α , γ), except otherwise noted.[‡] From ²²F β^- decay.# From (γ , γ').

@ From (t,p).

& Average of data from (t,p) and (⁶Li,d). Uncertainty – lowest experimental value.^a From (α , γ).^b Weighted average of data from (α , γ) and (α ,n). Uncertainty – lowest experimental value.^c Identified as member of a rotational band based on 0⁺ g.s. in 1976Fi02 (α , γ).^d From ¹⁸O(⁴He,⁴He'):res. J^π assignments are based on double differential cross section measurements and fitting.^e From (¹²C, α). J^π assignments are based on the analysis of double (α , α) angular correlations with the residual ¹⁸O nucleus in the 0⁺ ground state.^f Natural/Unnatural parity quoted in comment column from 1971Ol01 – $\sigma(180^\circ)$ (α , α').^g Γ_0 values from (α ,n):res, except otherwise noted.^h From (¹²C, α).ⁱ From 1993Ol05 (α , γ).^j From (⁴He,⁴He'):Re.^k From (e,e'). $\gamma(^{22}\text{Ne})$

$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ [@]	E_f	J_f^π	Mult. [@]	δ ^{@b}	Comments
1274.537	2 ⁺	1274.537 7	100	0.0	0 ⁺	E2		B(E2)(W.u.)=12.76 18 E γ ,Mult.: From ²² Na β^+ decay.
3357.2	4 ⁺	2082.6 [‡] 5	100	1274.537	2 ⁺	E2		B(E2)(W.u.)=17.5 4
4456.2	2 ⁺	1099 [#]		3357.2	4 ⁺			
		3181.4	100.0 21	1274.537	2 ⁺	M1+E2	+0.09 2	B(M1)(W.u.)=0.18 12; B(E2)(W.u.)=1.0 8 δ : Average of +0.11 3 (1994Br11 – also

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Adopted Levels, Gammas (continued)

$\gamma(^{22}\text{Ne})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^@$	E_f	J_f^π	Mult. $^@$	$\delta^{@b}$	Comments
								possibility of a large value), +0.08 2 (1967Bu01).
4456.2	2 ⁺	4455.7	3.1 21	0.0	0 ⁺	E2		B(E2)(W.u.)=0.7 5
5146.0	2 ⁻	689.8	89 ^a 6	4456.2	2 ⁺	E1+M2	-0.29 2	B(E1)(W.u.)=0.0014 4; B(M2)(W.u.)=1.2×10 ³ 4 δ : Other value: +0.04 8 (1967Bu01).
		3871.1	100 ^a 6	1274.537	2 ⁺	E1+M2	+0.96 18	B(E1)(W.u.)=5.1×10 ⁻⁶ 17; B(M2)(W.u.)=1.4 5 δ : Other value: +0.10 10 1972Ho52.
5329.6	1 ⁺	4054.6	50 12	1274.537	2 ⁺	M1+E2	+1.9 5	B(M1)(W.u.)=0.020 11; B(E2)(W.u.)=31 12 δ : Weighted average of -1.7 10 (1972Ho52) and -2.0 6 (1993OI05).
5363.4	2 ⁺	5328.9 4088.4	100 12 100 4	0.0 1274.537	0 ⁺ 2 ⁺	[M1] M1+E2	-0.19 4	B(M1)(W.u.)=0.081 25 B(M1)(W.u.)=0.0039 8; B(E2)(W.u.)=0.06 3 δ : Weighted average of -0.12 6 (1993OI05), -0.25 8 (1968Ku05), and -0.27 8 (1976Fi02).
5523.3	(4) ⁺	5362.7 2166.1 [‡] 5	16 4 100.0 [‡] 6	0.0 3357.2	0 ⁺ 4 ⁺	[E2] M1		B(E2)(W.u.)=0.070 22 B(M1)(W.u.)=0.102 15 δ : -0.04 3 (1993OI05) and -0.07 12 (1968Ku05) both in (α , γ)).
5641.2	3 ⁺	4247.9 [‡] 10 2283.9 [‡] 7	1.6 [‡] 3 45 [‡] 3	1274.537 3357.2	2 ⁺ 4 ⁺	E2 M1(+E2)	-0.12 17	B(E2)(W.u.)=0.084 20 B(M1)(W.u.)>0.18 I_γ : Other value: 30 4 in (t, γ). δ : From 1968Ku05 (α , γ)).
		4366.1 [‡] 10	100 [‡] 3	1274.537	2 ⁺	M1+E2	+0.15 2	B(M1)(W.u.)>0.059; B(E2)(W.u.)>0.36 δ : Weighted average of +0.18 3 (1968Ku05), +0.19 4 (1967Bu01), +0.13 3 (1972Ho52), and +0.16 3 (1976Br06).
5910.1	3 ⁻	1453.8	21 6	4456.2	2 ⁺	E1(+M2)	+0.19 10	B(E1)(W.u.)=(0.0013 6); B(M2)(W.u.)=(1.0×10 ² 5)
		2552.7 4635.0	21 6 100 6	3357.2 1274.537	4 ⁺ 2 ⁺	E1+M2	+0.17 6	B(E1)(W.u.)=0.00019 7; B(M2)(W.u.)=1.1 9 δ : Other value: 0.02 2 (1976Br06).
6119.9	2 ⁺	1663.6	10.3 ^a 13	4456.2	2 ⁺	M1+E2	+1.1 3	B(M1)(W.u.)=0.012 8; B(E2)(W.u.)=38 22
		4844.8	100 ^a 4	1274.537	2 ⁺	M1+E2	+2.3 3	B(M1)(W.u.)=0.0017 10; B(E2)(W.u.)=2.7 14 δ : also an alternate value: -0.11 4 (1993OI05).
		6119.0	18 ^a 3	0.0	0 ⁺	E2		B(E2)(W.u.)=0.18 10 Mult.: From (e,e') based on B(E2).
6235	0 ⁺	905	100	5329.6	1 ⁺			
6311.0	(6 ⁺)	2953.6	100	3357.2	4 ⁺	[E2]		B(E2)(W.u.)=14.0 12
6345.1	4 ⁺	2987.7 [‡] 9	100	3357.2	4 ⁺	M1+E2	+0.68 16	B(M1)(W.u.)=0.043 12; B(E2)(W.u.)=16 7
6635.8	(3,4) ⁺	3278.3	89 6	3357.2	4 ⁺	M1+E2	-0.9 3	B(M1)(W.u.)=0.0033 18; B(E2)(W.u.)=1.8 10
6689.0	1 ⁻	5360.6 5413.7 6687.9	100 6 45 9 100 9	1274.537 1274.537 0.0	2 ⁺ 2 ⁺ 0 ⁺	[E1] (E1)		B(E1)(W.u.)=7.E-6 4 B(E1)(W.u.)=8.E-6 5

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

$\gamma(^{22}\text{Ne})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\text{@}$	E_f	J_f^π	Mult. $^\text{@}$	$\delta^\text{@b}$	Comments
6819.4	2 ⁺	1455.9	43 16	5363.4	2 ⁺			
		1673.3	57 16	5146.0	2 ⁻			
		2363.1	100 16	4456.2	2 ⁺	M1+E2	+2.5 4	B(M1)(W.u.)>0.021; B(E2)(W.u.)>2.1×10 ²
		5544.1	70 16	1274.537	2 ⁺	M1		B(M1)(W.u.)>0.011 δ : +0.10 10 1993OI05 (α ,py).
6853.5	(1 ⁺)	5578.2	85 8	1274.537	2 ⁺	M1+E2	+1.3 5	B(M1)(W.u.)=0.06 4; B(E2)(W.u.)=22 12
		6852.3	100 8	0.0	0 ⁺	M1		B(M1)(W.u.)=0.10 5
6900	0 ⁺	5624.7	100	1274.537	2 ⁺	E2		B(E2)(W.u.)=0.36 4
7051	1 ⁻	5776	100.0 ^a 11	1274.537	2 ⁺	[E1]		B(E1)(W.u.)=4.1×10 ⁻⁵ 13
		7050	9.9 ^a 11	0.0	0 ⁺	[E1]		B(E1)(W.u.)=2.2×10 ⁻⁶ 7
7341.1	0 ⁺	2011.4	100 8	5329.6	1 ⁺	(M1)		B(M1)(W.u.)>0.51
		2884.7	75 8	4456.2	2 ⁺	(E2)		B(E2)(W.u.)>1.1×10 ²
7341.2	(4) ⁺	1430.9	100 6	5910.1	3 ⁻			E_γ : γ -ray not seen in $^{22}\text{F} \beta^-$ decay. I_γ from (α ,py).
		3983.5 [‡] 10	96 6	3357.2	4 ⁺	M1+E2	-0.7 3	B(M1)(W.u.)=0.0033 22; B(E2)(W.u.)=0.7 6
7405.9	(3) ⁻	2259.8	100 3	5146.0	2 ⁻	M1+E2	+1.3 4	B(M1)(W.u.)=0.014 7; B(E2)(W.u.)=33 13
		6130.4	56 3	1274.537	2 ⁺	E1		B(E1)(W.u.)=4.2×10 ⁻⁵ 14
7423.0	(5 ⁺)	1900.0 [‡] 6	100	5523.3	(4) ⁺			
7469?	1,2	1559	100	5910.1	3 ⁻			
7489	1 ⁻	1369	10 6	6119.9	2 ⁺			
		2125	10 6	5363.4	2 ⁺			
		6213	23 6	1274.537	2 ⁺			
		7487	100 6	0.0	0 ⁺	E1		
7643.1	2 ⁺	3186.7	42 5	4456.2	2 ⁺			
		6367.6	100 5	1274.537	2 ⁺	M1+E2	-0.08 5	δ : From 1976Fi02.
		7641.7	12 5	0.0	0 ⁺	E2		
7663.7	(2) ⁻	1428.7	100	6235	0 ⁺			
7722.0	3 ⁻	1602.0	19 16	6119.9	2 ⁺			
		2198.6	25 16	5523.3	(4) ⁺			
		2575.8	22 16	5146.0	2 ⁻			
		3265.5	100 16	4456.2	2 ⁺			
		4364.3	78 16	3357.2	4 ⁺			
7921	(2) ⁺	6446.5	69 16	1274.537	2 ⁺			
		580	20 15	7341.2	(4) ⁺			
		1102	29 15	6819.4	2 ⁺			
		2398	33 15	5523.3	(4) ⁺			
		6645	100 15	1274.537	2 ⁺			
8076.9	(4) ⁺	1765.8	50 22	6311.0	(6) ⁺			
		2713.3	36 22	5363.4	2 ⁺			
		4719.1	100 22	3357.2	4 ⁺			
		6801.2	92 22	1274.537	2 ⁺			
8134.3	2 ⁺	1314.9	8 3	6819.4	2 ⁺			
		6858.6	100 3	1274.537	2 ⁺	M1+E2	-0.48 5	I_γ : From 1976Fi02 (α ,py).
8162.2	2 ⁺ , 3, 4 ⁺	1342.8	8 8	6819.4	2 ⁺			
		4804.4	44 8	3357.2	4 ⁺			
		6886.5	100 8	1274.537	2 ⁺			
8375.9	(3) ⁻	712.2	8 7	7663.7	(2) ⁻			
		5018.1	100 7	3357.2	4 ⁺			
		7100.1	28 7	1274.537	2 ⁺			
8489.6	2 ⁺	412.7	32 32	8076.9	(4) ⁺			
		1148.4	100 32	7341.2	(4) ⁺			
		2254.5	82 32	6235	0 ⁺			

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Adopted Levels, Gammas (continued)

$\gamma(^{22}\text{Ne})$ (continued)						
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	I_γ°	E_f	J_f^π	Mult. @
Comments						
8489.6	2 ⁺	2848.2	71 32	5641.2	3 ⁺	
		5131.8	71 32	3357.2	4 ⁺	
8561.4	(1,2) ⁺	1872.3	72 12	6689.0	1 ⁻	
		8559.6	100 12	0.0	0 ⁺	
8596.0		519.1	100 6	8076.9	(4) ⁺	
		3449.7	20 6	5146.0	2 ⁻	
8741.0	(3) ⁻	1399.6	19 12	7341.2	(4) ⁺	
		1689.9	28 12	7051	1 ⁻	
		4284.3	100 12	4456.2	2 ⁺	
		5383.1	28 12	3357.2	4 ⁺	
8855.3	(4) ⁺	1449.3	39 10	7405.9	(3) ⁻	
		2544.1	100 10	6311.0	(6 ⁺)	
8900.3		1477.2	54 33	7423.0	(5 ⁺)	
		1559.0	100 33	7341.2	(4) ⁺	
		2211.2	71 33	6689.0	1 ⁻	
		2589.1	79 33	6311.0	(6 ⁺)	
		3258.8	54 33	5641.2	3 ⁺	
		3536.6	58 33	5363.4	2 ⁺	
8976		1312	56 11	7663.7	(2) ⁻	
		1925	100 11	7051	1 ⁻	
9045	(2 ⁺ ,3 ⁻)	1402	71 24	7643.1	2 ⁺	
		1994	92 24	7051	1 ⁻	
		5687	100 24	3357.2	4 ⁺	
9178	1 ⁺	9176	100	0.0	0 ⁺	E _γ : placement in (γ,γ).
9178.1	(4) ⁺	3267.6	64 11	5910.1	3 ⁻	
		4721.3	25 11	4456.2	2 ⁺	
		5819.9	100 11	3357.2	4 ⁺	
9229	2 ⁺	1565	79 9	7663.7	(2) ⁻	
		2178	100 9	7051	1 ⁻	
9250		1528	100 11	7722.0	3 ⁻	
		3130	56 11	6119.9	2 ⁺	
9324		1602	100	7722.0	3 ⁻	
9625	5	3314	45	6311.0	(6 ⁺)	
		6267	100	3357.2	4 ⁺	
10208.5	1 ⁻	8932.0	25 & 6	1274.537	2 ⁺	
		10206.0	100 & 6	0.0	0 ⁺	E1
10280.4	(0 ⁺ ,1 ⁻ ,2 ⁺)	2791.2	23 & 7	7489	1 ⁻	
		3426.6	45 & 9	6853.5	(1 ⁺)	
		4950.2	100 & 12	5329.6	1 ⁺	
		5823.4	2 & 1	4456.2	2 ⁺	
		9003.9	57 & 12	1274.537	2 ⁺	
10294.8	(2 ⁺)	2805.6	19 & 5	7489	1 ⁻	
		3441.0	16 & 5	6853.5	(1 ⁺)	
		4964.6	30 & 7	5329.6	1 ⁺	
		5837.8	11 & 4	4456.2	2 ⁺	
		9018.3	100 & 12	1274.537	2 ⁺	
10416.4		4071		6345.1	4 ⁺	
10616	(5 ⁻)	4270	100 & 8	6345.1	4 ⁺	
		7258	52 & 8	3357.2	4 ⁺	
10696		7337	100	3357.2	4 ⁺	
10706		9429	100	1274.537	2 ⁺	
10749	5 ⁻	4437	100 & 10	6311.0	(6 ⁺)	

E_γ: placement in (γ,γ).

D δ: 0.04 5 in (α,γ).

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Adopted Levels, Gammas (continued) $\gamma(^{22}\text{Ne})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^@$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^@$	E_f	J_f^π
10749	5 ⁻	7390	92& 10	3357.2	4 ⁺	11269	2 ⁺ ,3 ⁺ ,4 ⁺	6122	100& 15	5146.0	2 ⁻
10857	3 ⁻	9580	100	1274.537	2 ⁺			7910	81& 15	3357.2	4 ⁺
10921	1 ⁻	9644	100& 9	1274.537	2 ⁺	11431		10154	100	1274.537	2 ⁺
		10918	79& 9	0.0	0 ⁺	11465	(1 ⁻)	6320	100& 4	5146.0	2 ⁻
11032	(8 ⁺ ,6 ⁺)	4721 [#]		6311.0	(6 ⁺)			10190	33& 4	1274.537	2 ⁺
11130	6,7	4818	100	6311.0	(6 ⁺)			11464	49& 4	0.0	0 ⁺
11194		2294	100& 4	8900.3		11522	7 ⁻	5221	100	6311.0	(6 ⁺)
		9917	18& 4	1274.537	2 ⁺						

[†] From level energy difference, recoil energy subtracted, except otherwise noted.

[‡] From $^{22}\text{F} \beta^-$ decay, except otherwise noted.

[#] Placement from ($^{26}\text{Mg}, ^{22}\text{Ne} \gamma$).

[@] From 1993OI05 ($\alpha, \text{p}\gamma$), except otherwise noted.

[&] From (α, γ).

^a From ($\text{t}, \text{p}\gamma$).

^b From ($\alpha, \text{p}\gamma$), except otherwise noted.

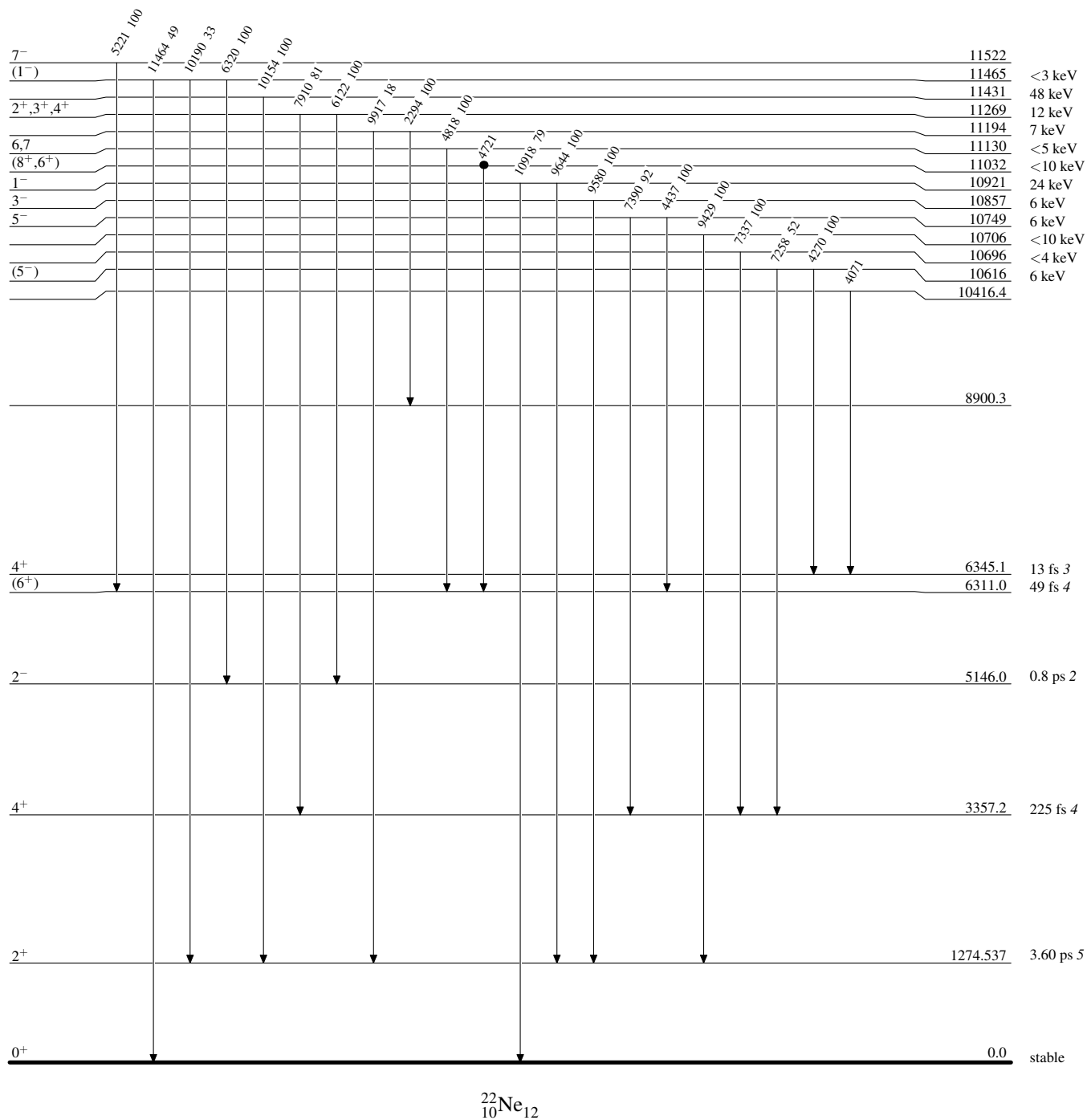
Adopted Levels, Gammas

Legend

Level Scheme

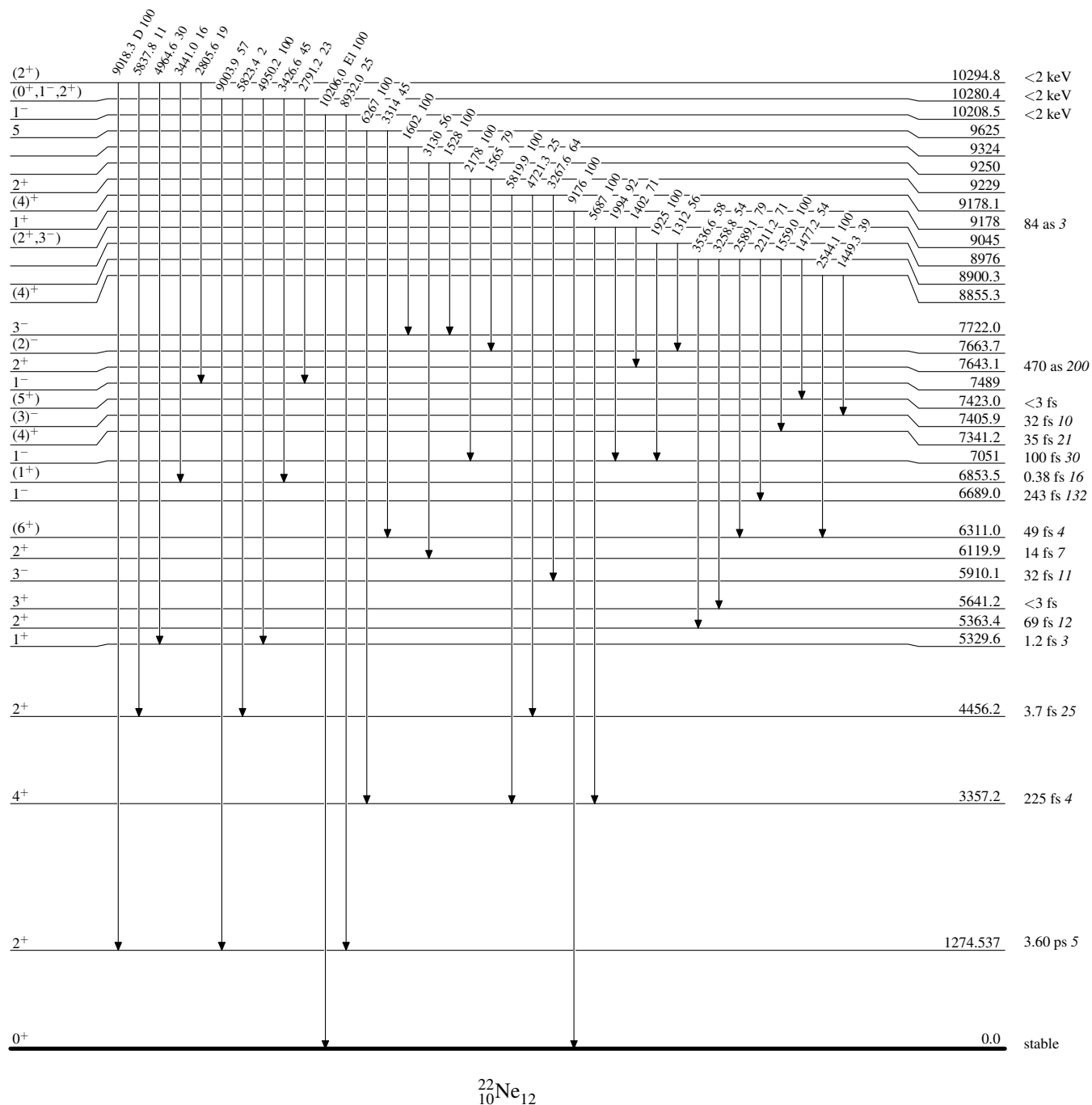
Intensities: Relative photon branching from each level

● Coincidence



Adopted Levels, Gammas**Level Scheme (continued)**

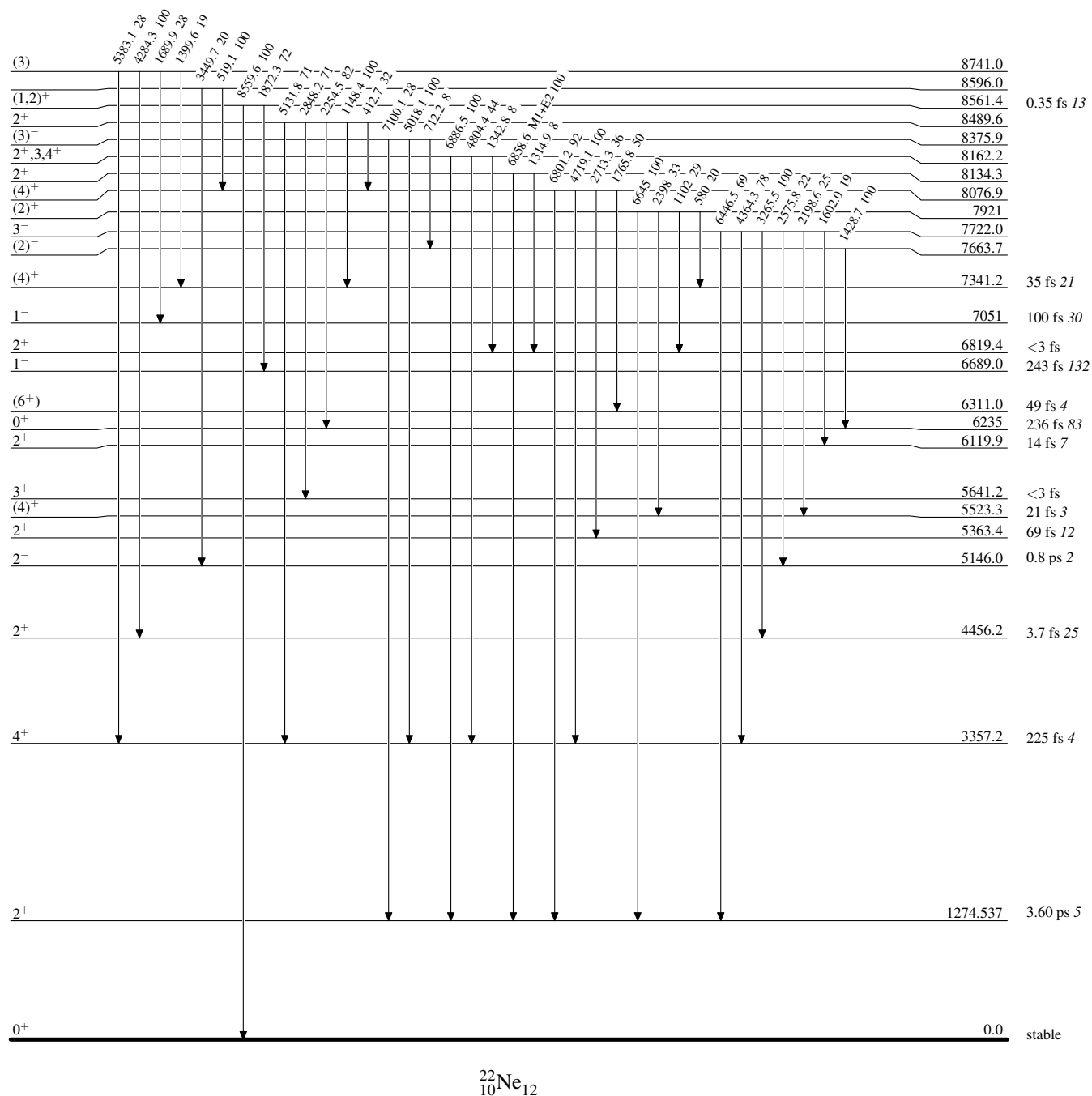
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

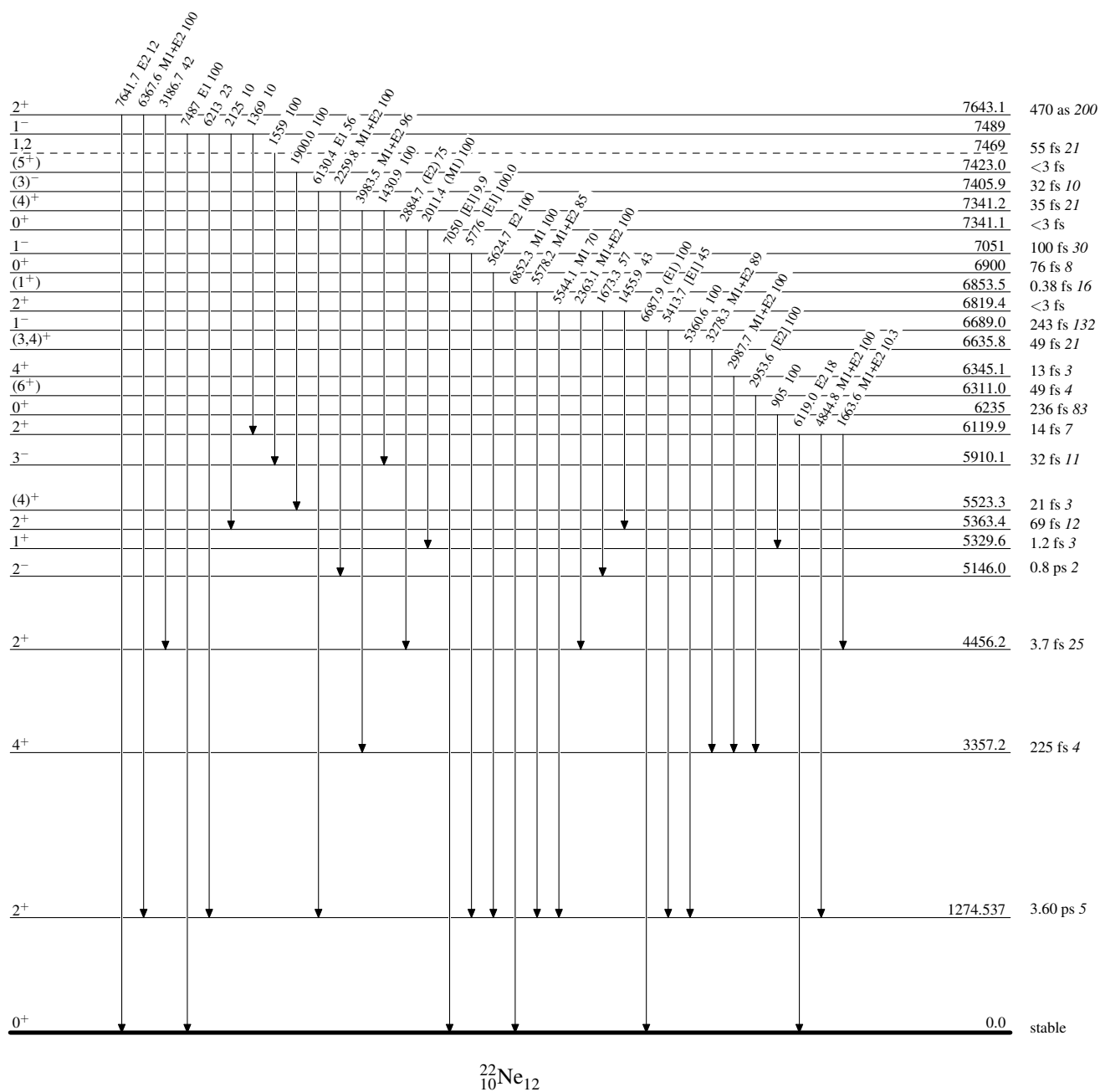
Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level

