$^{12}C(^{16}O,\alpha),(^{16}O,\alpha\gamma)$ 1975Br10,1988Ve06,2012Di04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

Others: 2017Fa10, 2005St09, 2003Me27, 2001Tu06, 2001Wi18, 2001Wi07, 1998Ke02, 1998Fr03, 1998Mu16, 1995Fr12, 1994Co01, 1994Ku18, 1994Ra16, 1994Ra15, 1991Co10, 1991Co09, 1984Le21, 1983Be09, 1983Sp01, 1979ToZQ, 1979WrZZ, 1978La05, 1978We03, 1976Br34, 1975Ho15, 1974Fo11, 1973Fi13, 1972Br59, 1972Gr44, 1971Br47, 1971Go03, 1970Al10, 1970Mi06, 1970Cu02, 1968Cu05, 1968Ol04, 1964Hi02, 1963Ev03.

1975Br10: $^{20}C(^{16}O,\alpha\gamma)$, E=26.70, 34.29 MeV; Measured $\alpha\gamma$- and $\gamma\gamma$ coincidences, DSA. Ge(Li), Si surface barrier detectors. Also 1969BrZM.

1988Ve06: $^{20}C(^{16}O,\alpha)$, E=31.73, 32.80, 33.85, 34.70 MeV; Measured $\sigma(E\alpha,E(^{24}Mg))$, magnetic spectrometer.

2012Di04: Two experiments are reported: First – $(^{16}O,\alpha\gamma)$, $E(^{12}C)$=62 MeV from ATLAS facility at Argonne. Measured $\alpha\gamma$ and $\alpha\gamma\gamma(\theta)$ coincidences using DSSDs for α particles and Gammasphere array for γ rays. The two γ-rays are from the decay of excited states in ^{20}Ne populated in α decay of high-energy excited states of ^{24}Mg. Second – $(^{16}O,\alpha\gamma)$ – $E(^{12}C)$=68 MeV from the superconducting linear accelerator at Florida State University. Measured ^{20}Ne+2α and ^{16}O+3α coincidence spectra and $\alpha\alpha$ angular correlations using DSSDs.

1971Go03: $(^{16}O,\alpha_1)$; E=48, 48.8, 58.3 MeV; measured $\sigma(E\alpha_1, E\alpha_2, \theta((\alpha_1)(\alpha_2)))$. Deduced levels, spin, parity branching ratios. FWHM = 250 keV for α group at §20 MeV.

1972Gr44: $(^{16}O,\alpha)$, E(cm)=19-25 MeV; measured $\sigma(E, E\alpha, \theta)$. Deduced levels, level-width. Level energy normalized to that in 1970Mi06. Reported $d\sigma/d\Omega$ energy-averaged from 19-25 MeV (c.m.). FWHM=50 keV.

1974Fo11: $^{12}C(^{16}O,\alpha)$, E=40-46 MeV; Measured $\sigma(E)$. Magnetic spectrometer.

1984Le21: $(^{16}O,\alpha)$, E=60-100 MeV; measured $\sigma(\theta)$, $\alpha\alpha$-coin. Deduced level energies within 25 keV accuracy, Γ.

^{24}Mg Levels

E(level)[†]	J$^{\pi}$[h]	$T_{1/2}$ or Γ	Comments
0	N[k]		
1368.7	N[k]	1.39 ps *9*	E(level): From Adopted Levels, rounded value. $T_{1/2}$ or Γ: From mean lifetime τ=2.00 ps *13*: Weighted average τ=1.82 ps *14* (1974Fo11), 2.11 ps *16* (1970Al10), 2.09 ps *13* (1975Ho15 – recoil distance method), 2.07 ps *34* (1970Cu02 – DSA – same group earlier value 1.51 ps *17* (1968Cu05)). Uncertainty is the lowest input value.
4123 *3*	N[k]	35 fs *6*	$T_{1/2}$ or Γ: From mean lifetime τ=50 fs *9*: Weighted average of 53 fs *9* (1975Br10) and 48 fs *9* (1983Sp01).
4238 *3*	N[k]	63 fs *10*	$T_{1/2}$ or Γ: From mean lifetime τ=91 fs *15*: Weighted average of τ=85 fs *15* (1975Br10). Other: τ=110 fs *26* (1970Cu02 – revised value of τ=83 fs *16* (1968Cu05)). Uncertainty is the lowest input value.
5235 *3*	U[k]	76 fs *10*	$T_{1/2}$ or Γ: From τ=109 fs *15* (1975Br10) – observed as the second member of a γ-cascade.
6010 *3*	N[k]	53 fs *10*	$T_{1/2}$ or Γ: From τ=77 fs *14* (1975Br10).
6432	N[k]	46 fs *20*	$T_{1/2}$ or Γ: From τ=66 fs *29* (1976Br34).
7348.60[g] *10*	N[l]		
7555.3[g] *10*	N[l]		
7616.41[g] *7*	N[l]		
7747.7[g] *2*	U[l]		
7813 *3*	U[l]	24 fs *3*	$T_{1/2}$ or Γ: From τ=35 fs *5* (1975Br10).
8113 *3*	N[l]	3.9 fs *21*	$T_{1/2}$ or Γ: From τ=5.6 fs *30* (1975Br10).
8358	N	76 fs *38*	$T_{1/2}$ or Γ: From τ=110 fs *55* (1971Br47).
8439.29[g] *5*	N[l]		
8655	N[l]	19 fs *5*	$T_{1/2}$ or Γ: From τ=28 fs *7* (1976Br34).
8864.5[g] *2*	U[l]		
9003.5[g] *2*	N[l]		
9146.2[g] *3*	N[l]		

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$^{12}C(^{16}O,\alpha),(^{16}O,\alpha\gamma)$ 1975Br10,1988Ve06,2012Di04 (continued)

^{24}Mg Levels (continued)

E(level)[†]	J$^\pi$[h]	$T_{1/2}$ or Γ	Comments
9284.4[g] *3*	N[l]		J$^\pi$: Probably for doublet (1964Hi02).
9305		173 fs *35*	$T_{1/2}$ or Γ: From τ=250 fs *50* (1971Br47).
9457.81[g] *4*	(U)[l]		
9516.18[g] *5*	N[l]		
9528 *3*		8 fs *4*	$T_{1/2}$ or Γ: From τ=12 fs *6* (1975Br10) − observed as the second member of a γ-cascade.
10026 *4*	N	62 fs *18*	J$^\pi$: From 1971Br47. $T_{1/2}$ or Γ: From τ=89 fs *26* (1971Br47). Γα<0.0077 meV (1988Ve06).
10059 *4*			$T_{1/2}$ or Γ: Γα<0.02 meV (1988Ve06).
10112 *4*	0$^+$		J$^\pi$: From 1968Ol04, on the basis of simultaneous fits to the angular correlations of the two cascade gamma rays involved. $T_{1/2}$ or Γ: Γα=0.29 meV *6* (1988Ve06).
10162 *4*			
10328 *4*			$T_{1/2}$ or Γ: Γα=0.043 meV *9* (1988Ve06).
10358 *4*			$T_{1/2}$ or Γ: Γα=0.10 meV *2* (1988Ve06).
10578 *4*		9 fs *2*	$T_{1/2}$ or Γ: From τ=13 fs *3* (1976Br34). Γα<0.023 meV (1988Ve06).
10660 *4*			
10680 *4*		2.1 eV *8*	$T_{1/2}$ or Γ: Γα=2.1 eV *7* (1988Ve06).
10712 *4*			
10733 *4*			$T_{1/2}$ or Γ: Γα=0.52 meV *10* (1988Ve06).
10823 *4*		7.5 eV *11*	$T_{1/2}$ or Γ: Γα < 0.024 meV (1988Ve06).
10922 *4*			$T_{1/2}$ or Γ: Γα=7.0 eV *11* (1988Ve06).
11008 *4*			
11018 *4*			$T_{1/2}$ or Γ: Γα>1.1 eV (1988Ve06).
11128 *3*		26 fs *4*	$T_{1/2}$ or Γ: From τ=38 fs *6* (1979ToZQ).
11161 *4*			$T_{1/2}$ or Γ: Γα>0.43 eV (1988Ve06).
11182 *4*			
11207 *4*		0.0022 eV *12*	$T_{1/2}$ or Γ: Γα=0.90 meV *+12−6* (1988Ve06).
11217 *4*		0.78 eV *11*	$T_{1/2}$ or Γ: Γα=0.44 eV *7* (1988Ve06).
11294 *4*		20 fs *3*	E(level): Others: (11.31 *3*) × 10^3 (1984Le21 − may be a doublet). $T_{1/2}$ or Γ: From τ=29 fs *4* (1979ToZQ). Others: Γ < 15 keV (1984Le21); Γα < 0.38 meV (1988Ve06).
11320 *4*			E(level): Other: (11.31 *3*) × 10^3 (1984Le21 − may be a doublet). $T_{1/2}$ or Γ: Γα<0.52 meV (1988Ve06); Γ < 15 keV (1984Le21).
11331 *4*			
11390 *4*			$T_{1/2}$ or Γ: Γα 0.5 keV (1988Ve06).
11394 *4*			
11455 *4*			$T_{1/2}$ or Γ: Γα > 12 eV (1988Ve06).
11519 *4*			$T_{1/2}$ or Γ: Γα 0.5 keV (1988Ve06).
11528 *4*			
11595	N	15 fs *4*	J$^\pi$: From 1971Br47. $T_{1/2}$ or Γ: From τ=22 fs *6* (1971Br47).
11619 *4*			
11694 *4*		1.6 eV *6*	$T_{1/2}$ or Γ: Γα=1.2 eV *4* (1988Ve06).
11727 *4*			$T_{1/2}$ or Γ: Γα=10 keV *2* (1988Ve06).
11827 *4*			
11860 *4*	8$^+$	63 fs *24*	E(level): Other: (11.85 *3*) × 10^3 (1984Le21). J$^\pi$: From 1978We03, based on the measurements of linear polarizations of γ rays from the 11860 ≥ 8120 ≥ 4120 decay in ^{24}Mg, the possibility of 6$^+$ assignment discarded with 85% confidence. Natural parity (1972Br59). $T_{1/2}$ or Γ: From τ=91 fs *35* (1972Br59). Others: Γα=8 keV *2* (1988Ve06); Γ < 15 keV (1984Le21).
11930 *4*			
11963 *4*			$T_{1/2}$ or Γ: Γα=1.8 keV *4* (1988Ve06).
11985 *4*			$T_{1/2}$ or Γ: Γα < 7.8 eV (1988Ve06).
12.10×10^3	4$^+$[j]		E(level): From 1971Go03.

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$^{12}C(^{16}O,\alpha),(^{16}O,\alpha\gamma)$ 1975Br10,1988Ve06,2012Di04 (continued)

^{24}Mg Levels (continued)

E(level)[†]	Jπ[h]	$T_{1/2}$ or Γ	Comments
12340[‡] *20*		3.5 fs *14*	$T_{1/2}$ or Γ: From τ=5 fs *2* (1975Br10).
12440[@]	$6^+,7^-$	11 fs *3*	E(level): Others: (12.45 *2*) × 10^3 (1974Fo11); 12.45 × 10^3 (1971Go03); (12.43 *3*) × 10^3 (1984Le21). Jπ: 7^- in 1971Go03. $T_{1/2}$ or Γ: From τ=16 fs *4* (1979WrZZ). Other: Γ < 15 keV (1984Le21).
12.54×10^3 *3*		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
12620[‡] *20*			
12840[‡] *20*		<15 keV	$T_{1/2}$ or Γ: From 1984Le21.
12950[‡f] *20*	(4,5)		
13.04×10^3 *3*		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
13070[‡f] *20*	5^-[j]		Jπ: Other: (4,5) for doublet (2012Di04).
13220 *20*		2.3 fs *12*	$T_{1/2}$ or Γ: From τ=3.3 fs *17* (1975Br10). Other: Γ < 15 keV (1984Le21).
13450[‡] *20*	6^+	≤15 keV	E(level): Others: 13.42 × 10^3 (2012Di04 – ($^{16}O,\alpha\gamma$)) – probably same level; 13.44 × 10^3 (1971Go03); (13.44 *3*) × 10^3 1984Le21). $T_{1/2}$ or Γ: From 1984Le21.
13840[‡] *20*		≤15 keV	E(level): Others: (13.86 *3*) × 10^3 (1972Gr44); 13.84 × 10^3 (1970Mi06); (13.82 *3*) × 10^3 (1984Le21). $T_{1/2}$ or Γ: From 1984Le21. dσ/dΩ (12°)=1.2 mb/sr (1972Gr44).
14140[‡] *20*	8^+[j]	<4 fs	E(level): Others: 14.10 × 10^3 (2012Di04 – ($^{16}O,\alpha\gamma$)) – probably same level; (14.14 *3*) × 10^3 (1972Gr44); 14152 (1975Br10); 14.14 × 10^3 (1970Mi06); (14.15 *3*) × 10^3 (1984Le21). dσ/dΩ (12°)=2.0 mb/sr (1972Gr44). $T_{1/2}$ or Γ: From τ < 6 fs (1975Br10). Other: Γ < 15 keV (1984Le21).
14.32×10^3[#b]	4^+		E(level): Other: (14.31 *3*) × 10^3 (1972Gr44). dσ/dΩ (12°)=0.8 mb/sr (1972Gr44 – not seen at all energies).
14410[‡] *20*	4^+[j]		
14560[‡] *20*			E(level): Other: (14.54 *3*) × 10^3 (1972Gr44). dσ/dΩ (12°)=1.1 mb/sr (1972Gr44 – not seen at all energies).
14.65×10^3[#b]	(4^+)		
14740[‡] *20*			
14920[‡] *20*			E(level): Other: (14.90 *3*) × 10^3 (1972Gr44). dσ/dΩ (12°)=0.6 mb/sr (1972Gr44 – not seen at all energies).
15150[‡] *20*	7^-	<15 keV	E(level): Others: 15.10 × 10^3 (2012Di04 – ($^{16}O,\alpha\gamma$)) – probably same level; (15.15 *3*) × 10^3 (1972Gr44); 15.15 × 10^3 (1971Go03, 1970Mi06); 15.13 × 10^3. $T_{1/2}$ or Γ: From 1984Le21. dσ/dΩ (12°)=3.8 mb/sr (1972Gr44).
15210[‡] *20*			E(level): Other: (15.19 *3*) × 10^3 (1972Gr44). dσ/dΩ (12°)=1.5 mb/sr (1972Gr44 – not seen at all energies).
15540[‡] *20*		<15 keV	E(level): Other: (15.50 *3*) × 10^3 (1984Le21). $T_{1/2}$ or Γ: From 1984Le21.
15640[‡] *20*	(6^+)		E(level): Other: 15.62 × 10^3 (2012Di04 – ($^{16}O,\alpha\gamma$)).
15800[‡] *20*			E(level): Other: (15.77 *3*) × 10^3 (1972Gr44). dσ/dΩ (12°)=1.4 mb/sr (1972Gr44).
16070[‡] *20*	6^+		T=0 E(level): Others: 16.09 × 10^3 (2012Di04 – ($^{16}O,\alpha\gamma$)); (16.08 *3*) × 10^3 (1972Gr44); 16.07 × 10^3 (1971Go03). dσ/dΩ (12°)=1.2 mb/sr (1972Gr44).
16.15×10^3 *3*		19 keV *6*	E(level),$T_{1/2}$ or Γ: From 1984Le21.
16.22×10^3 *3*			E(level): From 1972Gr44.

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$^{12}C(^{16}O,\alpha),(^{16}O,\alpha\gamma)$ 1975Br10,1988Ve06,2012Di04 (continued)

^{24}Mg Levels (continued)

E(level)[†]	Jπ[h]	$T_{1/2}$ or Γ	Comments
			dσ/dΩ (12°)=1.9 mb/sr (1972Gr44).
16300[‡] *20*			T=0 E(level): Others: (16.29 *3*) × 10^3 (1972Gr44); 16.29 × 10^3 (1971Go03); 16.30 × 10^3 (1970Mi06). dσ/dΩ (12°)=3.0 mb/sr (1972Gr44).
16.46×10^3 *3*			E(level): From 1972Gr44. dσ/dΩ (12°) < 1 mb/sr (1972Gr44).
16560[‡] *20*	8$^+$		T=0 E(level): Others: 16.54 × 10^3 (2012Di04 − (^{16}O,αγ)); (16.55 *3*) × 10^3 (1972Gr44); 16.55 × 10^3 (1970Mi06). dσ/dΩ (12°)=5.8 mb/sr for doublet (1972Gr44).
16590[‡] *20*	6$^+$[j]		T=0 E(level): Others: (16.59 *3*) × 10^3 (1972Gr44); 16.59 × 10^3 (1971Go03). dσ/dΩ (12°)=5.8 mb/sr for doublet (1972Gr44).
16.70×10^3[@b] *4*	6$^+$[i]		
16.80×10^3 *3*		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
16.86×10^3[#c]	(6$^+$,7$^-$)		E(level): Others: (16.85 *3*) × 10^3 (1972Gr44); 16.86 × 10^3 (1971Go03); 16.84 × 10^3 (1970Mi06). dσ/dΩ (12°)=3.2 mb/sr (1972Gr44).
16904[‡] *3*		<7 fs	T=0 $T_{1/2}$ or Γ: From τ < 10 fs (1986Sm07).
16.93×10^3 *3*			E(level): From 1972Gr44. dσ/dΩ (12°) < 1 mb/sr (1972Gr44 − not seen at all energies).
17.03×10^3 *3*			E(level): From 1972Gr44. dσ/dΩ (12°) < 1 mb/sr (1972Gr44 − not seen at all energies).
17.12×10^3 *3*		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
17.20×10^3[d] *3*	8$^+$		E(level): From 1972Gr44. Others: 17.22 × 10^3 (2012Di04); 17.20 × 10^3 (1971Go03). dσ/dΩ (12°)=2.0 mb/sr (1972Gr44).
17.29×10^3[@b] *4*			
17.44×10^3[#c]	(6$^+$,7$^-$)		
17.52×10^3 *3*			E(level): From 1972Gr44. dσ/dΩ (12°) < 1 mb/sr (1972Gr44 − not seen in all energies).
17.59×10^3 *3*			E(level): From 1972Gr44. Other: 17.58 × 10^3 (1971Go03). dσ/dΩ (12°) < 2 mb/sr (1972Gr44 − not seen in all energies).
17.90×10^3[#c]	8$^+$		
18.16×10^3[#c]	8$^+$		
18.29×10^3[@b] *4*	6$^+$		
18.70×10^3[b] *10*			
18.97×10^3[#c]	8$^+$		
19.0×10^3[@c] *3*			
19.07×10^3[#d]	10$^+$		E(level): Other: (19.2 *1*) × 10^3 (2001Wi18 − same research group of 2012Di04. From measured Eα, 2001Wi18 report the excited level energy of 19139 keV *5* and note that for particle channel an uncertainty of 100 keV was expected with a possibility of doublet); 19.10 × 10^3 (1971Go03). γ-α branching ratio 0.0007 *3* (2001Wi18).
19.2×10^3[@c] *3*			E(level): Other: (19.20 *3*) × 10^3 (1984Le21 − observed in αα(θ) measurement).
19.21×10^3[&c] *4*	9$^-$		E(level): Other: 19.31 × 10^3 (1971Go03).
19.69×10^3 *3*			E(level): From 1984Le21 − − observed in αα(θ) measurement).
19.92×10^3[@c] *8*			
19.98×10^3[@b] *3*	7$^-$[i]	59 keV *5*	$T_{1/2}$ or Γ: From 1984Le21.

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$^{12}C(^{16}O,\alpha),(^{16}O,\alpha\gamma)$ 1975Br10,1988Ve06,2012Di04 (continued)

^{24}Mg Levels (continued)

E(level)[†]	J^{π}[h]	$T_{1/2}$ or Γ	Comments
20.03×10³ 3		28 keV 5	E(level),$T_{1/2}$ or Γ: From 1984Le21.
20.09×10³[d] 3	9⁻	35 keV 13	E(level),$T_{1/2}$ or Γ: From 1984Le21. Other: 20.09 × 10³ (2012Di04).
20.17×10³ 3		35 keV 13	E(level),$T_{1/2}$ or Γ: From 1984Le21.
20.24×10³[@b] 3	(8⁺)[i]	64 keV 8	$T_{1/2}$ or Γ,E(level): From 1984Le21. Other: (20.25 3) × 10³ (1984Le21).
20.28×10³[@c] 2			E(level): Other: 20.3 × 10³ (1971Go03).
20.42×10³[#d]	(9⁻)		
20.46×10³[@d] 1		<15 keV	$T_{1/2}$ or Γ,E(level): From 1984Le21. Other: (20.48 3) × 10³ (1984Le21).
20.53×10³[@b] 3	6⁺[i]	43 keV 13	E(level): Others: 20.52 × 10³ (1971Go03); (20.56 3) × 10³ (1984Le21).
20.68×10³[@c] 5			
20.83×10³ 3		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
20.91×10³ 3		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
20.94×10³ 3			E(level): From 1984Le21 − observed in $\alpha\alpha(\theta)$ measurement.
21.20×10³[@c] 2			
21.29×10³ 3		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
21.39×10³[@b] 2	6⁺[i]		E(level): Other: 21.34 × 10³ (1971Go03).
21.46×10³[@c] 2			
21.66×10³[@b] 5			
21.80×10³[@d] 1		<15 keV	E(level): Other: (21.85 3) × 10³ (1984Le21).
22.79×10³[@b] 2			
22.87×10³[@d] 1		<15 keV	E(level): Other: (22.89 3) × 10³ (1984Le21).
22.93×10³ 3		73 keV 13	E(level),$T_{1/2}$ or Γ: From 1984Le21.
23.00×10³[@c] 2			
23.10×10³ 3			E(level): decay analyzed through first 3⁻ at 5621 keV in ^{20}Ne. Other: (23.2 1)×10³ (1978La05).
23.19×10³ 3		<15 keV	E(level),$T_{1/2}$ or Γ: From 1984Le21.
23.26×10³[@d] 1		<15 keV	E(level): Others: (23.5 1)×10³ (1978La05) at θ_{lab}=7.5°; (23.23 3)×10³ (1984Le21).
23.77×10³[@d] 1			E(level): Other: (23.8 1)×10³ (1978La05) at θ_{lab}=7.5°.
24.37×10³ 3		27 keV 3	E(level),$T_{1/2}$ or Γ: From 1984Le21.
24.53×10³[@d] 5			E(level): Other: (24.2 1)×10³ (1978La05) at θ_{lab}=7.5°.
24.60×10³[@e] 3			E(level): Other: (24.7 1)×10³ (1978La05) at θ_{lab}=7.5°.
24.98×10³[@d] 14			E(level): Other: (24.9 1)×10³ (1978La05) at θ_{lab}=7.5°.
25.18×10³ 3		163 keV 6	E(level),$T_{1/2}$ or Γ: From 1984Le21.
25.40×10³[@e] 3			E(level): Other: (25.5 1)×10³ (1978La05) at θ_{lab}=7.5°.
26.0×10³[a] 1		<15 keV	E(level): Other: (26.05 3)×10³ (1984Le21).
26.28×10³[@] 2	12⁺[i]		E(level): decay analyzed through first 5⁻ and 6⁺ states at 8453 and 8778 keV, respectively in ^{20}Ne. Other: (26.3 1)×10³ (1978La05) at θ_{lab}=7.5°.
26.45×10³ 3		115 keV 20	E(level),$T_{1/2}$ or Γ: From 1984Le21.
26.67×10³[@e] 3	(12⁺)[i]		E(level): Other: (26.7 1)×10³ (1978La05) at θ_{lab}=7.5°.
27.4×10³[a] 1			
28.0×10³[a] 1			
28.5×10³[a] 1			
29.3×10³[a] 1			
29.7×10³[a] 1			
30.1×10³[a] 1			
31.2×10³[a] 1			
31.8×10³[a] 1			
32.6×10³[a] 1			
33.1×10³[a] 1			

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$^{12}C(^{16}O,\alpha),(^{16}O,\alpha\gamma)$ 1975Br10,1988Ve06,2012Di04 (continued)

^{24}Mg Levels (continued)

† From 1988Ve06, except otherwise noted.
‡ From 1974Fo11.
# From 2012Di04 ($^{16}O,\alpha\gamma$).
@ From 2012Di04 ($^{16}O,\alpha$).
& From 2012Di04 ($^{16}O,\alpha$). Reported both in ($^{16}O,\alpha\gamma$) and ($^{16}O,\alpha$).
a From 197La05, measured at 7.5° (lab).
b Decay analyzed through 0^+ g.s. of ^{20}Ne.
c Decay analyzed through first 2^+ at 1633 keV in ^{20}Ne.
d Decay analyzed through first 4^+ at 4247 keV in ^{20}Ne.
e Decay analyzed through first 6^+ at 8778 keV in ^{20}Ne.
f Reported as doublet of 13.03×10^3 (2012Di04) – probably of 12950 and 13070.
g From Adopted Levels.
h From 2012Di04, based on $\alpha\gamma\gamma$ angular correlations, the γ cascade is $2614\gamma - 1633\gamma$ in ^{20}Ne, except otherwise noted.
i From 2012Di04, based on $\alpha\alpha$ angular correlations.
j Proposed in 1971Go03, based on $\alpha\alpha$ correlation studies populated ^{24}Mg and ^{20}Ne states.
k Natural (N) or Unnatural (U) parity in 1963Ev03. Also in 1964Hi02.
l Natural (N) or Unnatural (U) parity in 1964Hi02.

$\gamma(^{24}Mg)$

E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Comments
7813	U	1800	6 *2*	6010	N	
		2580	58 *5*	5235	U	
		3690	34 *5*	4123	N	
9528		3520	78 *5*	6010	N	
		5400	22 *5*	4123	N	
12340		4527	100	7813	U	E_γ: From level energy difference. 4.54 MeV in 1975Br10 from 12.35 MeV level.
13220		5099		8113	N	E_γ: From 2001Wi18.
14140	8^+	4620 *25*	75 *3*	9528		
		6040 *25*	25 *3*	8113	N	
16904		5043	100	11860	8^+	E_γ: From level energy difference. Placement in 1986Sm07.
19.07×10^3	10^+	5850‡		13220		E_γ: From level energy difference. Tentatively placed in 2001Wi18 with a measured energy 5927 keV *5*.

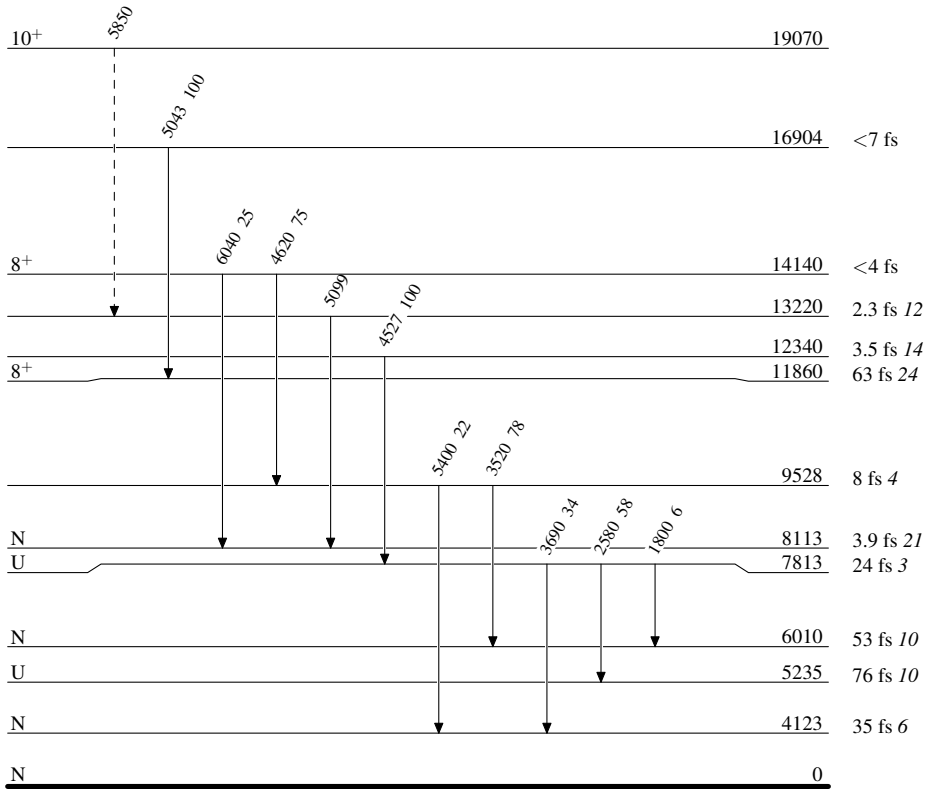
† From 1975Br10, except otherwise noted.
‡ Placement of transition in the level scheme is uncertain.

$^{12}C(^{16}O,\alpha),(^{16}O,\alpha\gamma)$ 1975Br10,1988Ve06,2012Di04 Legend

Level Scheme

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{24}_{12}Mg_{12}$