Table 16.11 from (1971AJ02): Resonances in $^{12}C + \alpha$

E_α (MeV $\pm$ keV)	$\Gamma_{c.m.}$ (keV)	Outgoing particles [a] (x)	Γ_x (keV)	$^{16}O^*$ (MeV)	$J^\pi; T$	Refs.
3.322 ± 30	550	γ_0	$(2.2 \pm 0.5) \times 10^{-5}$	9.58	1^-	(1953HI05, 1962JO09, 1964LA16, 1968CL04)
		α_0				
3.575 ± 10	1.1	γ_0	$(5.9 \pm 0.6) \times 10^{-6}$	9.842	2^+	(1953HI05, 1960ME02, 1962JO09, 1964LA16)
		α_0				
4.241 ± 25	195	α_0		10.341	4^+	(1962JO09)
4.260 ± 15	27 ± 4	γ_0		10.355		(1964LA16)
5.245 ± 8	0.3 ± 0.1	α_0		11.094	4^+	(1966LA09)
5.47	2500	α_0		11.26	0^+	(1954BI96)
5.71	830	α_0		11.44	3^-	(1968CL04)
5.809 ± 18	73 ± 5	γ_0	$(0.66 \pm 0.09) \times 10^{-3}$	11.517		(1960ME02, 1964LA16)
5.96	1200	α_0		11.63	3^-	(1954BI96)
6.518 ± 10	1.5 ± 0.5	α_0		12.048	0^+	(1966LA09)
7.045 ± 5	99 ± 7	γ_0	$(7 \pm 1) \times 10^{-3}$	12.443	$1^-; 0$	(1954BI96, 1964LA16, 1964MI12, 1968MO08)
		p	1.1			
		α_0	98 ± 8			
		α_1	0.025			
7.82 ± 10	150 ± 11	α_0	150 ± 11	13.02	2^+	(1968MO08)
7.915 ± 10	113 ± 15	γ_0	8.8×10^{-2}	13.095	$1^-; 1$	(1964LA16, 1964MI12, 1965MI05, 1968MO08)
		p	100			
		α_0	45 ± 18			
		α_1	1			
7.960 ± 10	128 ± 11	p	1	13.129	$3^-; 0$	(1964LA16, 1964MI08, 1965MI05, 1967LA1J, 1968MO08)
		α_0	90 ± 14			
		α_1	≈ 20			
		$\gamma_{4.4}$				
7.98 ± 100	≈ 250	γ_0		13.14	2^+	(1964LA16, 1965MI05)

Table 16.11 from (1971AJ02): Resonances in $^{12}C + \alpha$ (continued)

E_α (MeV $\pm$ keV)	$\Gamma_{c.m.}$ (keV)	Outgoing particles [a] (x)	Γ_x (keV)	$^{16}O^*$ (MeV)	$J^\pi; T$	Refs.
8.130 ± 15	26 ± 7	γ_0		13.257	$3^-; 1$	(1964LA16, 1964MI08, 1964MI12, 1965MI05, 1968MO08)
		p	4.5			
		α_0	9 ± 4			
		α_1	7.5			
		$\gamma_{4.4}$				
8.96	70	$\alpha_0, \gamma_{4.4}$		13.88	4^+	(1964LA16, 1964MI08, 1970OP01)
9.1	4800	α_0		14.0	0^+	(1968CL04)
10.08	400	$\gamma_{4,4}, (\alpha_0)$		14.72		(1964CA07, 1964LA16, 1964MI08)
10.18	40	$\alpha_0, \alpha_1, \gamma_{4,4}$		14.79	6^+	(1964CA07, 1964LA16, 1964MI08, 1970OP01)
10.25	55	p_0, α_0		14.85		(1964CA07)
11.02	≈ 100	$p_0, \alpha_0, \alpha_1, \gamma_{4.4}$		15.42	$(1^-, 3^-)$	(1964CA07, 1964MI08)
(11.08)	280	p_0, α_0		15.47		(1964CA07)
11.5	≈ 400	$\alpha_0, \alpha_1, \gamma_{4.4}$		15.8	3^-	(1964CA07, 1964MI08)
12.1	280	α_0		16.2	6^+	(1964CA07)
12.32 ± 25	45	γ_0, n, $p_0, \alpha_0, \alpha_1, \gamma_{4.4}$		16.40 [b]	2^+	(1964CA07, 1964MI08, 1967SU02, 1968BL08)
12.5	730	p_0, α_0		16.5		(1964CA07)
12.9	400	α_0		16.8	(4^+)	(1964CA07)
13.0	700	α_0		16.9	5^-	(1964CA07)
13.05	≈ 280	^{8}Be		16.94	2^+	(1967CH21)
13.26	110	n, $(p_0), \alpha_0, \alpha_1, \gamma_{4.4}$		17.10	$(1^-, 2^+, 0^+)$	(1964CA07, 1964MI08, 1968BL08)
13.35	200	^{8}Be		17.17	2^+	(1967CH21)
13.50	< 100	n		17.28		(1968BL08)
13.59	150	$\alpha_1, \gamma_{4.4}$		17.35		(1964MI08)
13.86	165	n, α_0		17.55	(4^+)	(1964CA07, 1968BL08)
13.95	110	p_0, α_0		17.62		(1964CA07, 1970BE1T)
14.1		^{8}Be		17.7	$0^+, 2^+$	(1967CH21)

Table 16.11 from (1971AJ02): Resonances in $^{12}C + \alpha$ (continued)

E_α (MeV $\pm$ keV)	$\Gamma_{c.m.}$ (keV)	Outgoing particles [a] (x)	Γ_x (keV)	$^{16}O^*$ (MeV)	$J^\pi; T$	Refs.
14.21	225	n, α_1, $\gamma_{4.4}$, ^{8}Be		17.81	4^+	(1964MI08, 1967CH21)
14.483 ± 15	14	p_0, α_0, α_1, ^{8}Be		18.018	$4^+; 0$	(1967CH21, 1968MO1H)
14.50	40	n, α_0, α_1, $\gamma_{4.4}$		18.03	(4^+)	(1964CA07, 1964MI08, 1968BL08)
14.59 ± 40	220 ± 60	n_0		18.10		(1963NE05, 1968BL08, 1970BE1T)
14.70 ± 25	390 ± 80	n		18.18	2^+	(1967SU02)
14.85	280	p_0, (α_0), α_1, $\gamma_{4.4}$		18.29		(1964CA07, 1964MI08)
15.0	510	α_0, $(\alpha_1, \gamma_{4.4})$		18.4	5^-	(1964CA07, 1964MI08)
15.2		^{8}Be		18.6	$0^+, 2^+$	(1967CH21)
15.2	140	α_0, $(\alpha_1, \gamma_{4.4})$		18.6	$(1^-, 5^-)$	(1964CA07, 1964MI08)
15.46	55	α_0		18.75	(1^-)	(1964CA07)
15.52	220	n, p_0, α_0, α_1, ^{8}Be		18.79	(4^+)	(1964CA07, 1964MI08, 1967CH21, 1968BL08)
15.88	broad	α_1, $\gamma_{4.4}$		19.06		(1964MI08)
15.96	41	(n), α_0		19.12	$(2^+, 4^+)$	(1964CA07, 1968BL08)
16.13	23	(n), α_0		19.25	(5^-)	(1964CA07, 1968BL08)
16.25	50	^{8}Be		19.34	6^+	(1967CH21)
16.30	23	α_0		19.38	$(4^+, 0^+)$	(1964CA07)
16.4	broad	α_1		19.5		(1964MI08)
16.62	240	n		19.62		(1968BL08)
16.73	17	α_0		19.70	even	(1964CA07)
(17.0)	825	α_0		(19.9)	(4^+)	(1964CA07)
17.10	140	α_0, α_1		19.98	$(2^+, 0^+, 1^-)$	(1964CA07, 1964MI08)
17.22	310	n		20.07		(1968BL08)
17.5	≈ 1500	p_0		20.3		(1960PR13)
17.66	< 150	n		20.40		(1968BL08)
(17.75)	110	α_0		(20.47)	(4^+)	(1964CA07)
17.90		α_1		20.58		(1964MI08)
18.21	< 25	n		20.81		(1968BL08)

Table 16.11 from (1971AJ02): Resonances in $^{12}C + \alpha$ (continued)

E_α (MeV $\pm$ keV)	$\Gamma_{c.m.}$ (keV)	Outgoing particles [a] (x)	Γ_x (keV)	$^{16}O^*$ (MeV)	$J^\pi; T$	Refs.
18.4	750	α_0		21.01	7^-	(1964CA07)
18.48	55	n		21.03		(1968BL08)
18.50 ± 25	240 ± 80	γ_0		21.0	1^-	(1967SU02)
18.5	900	α_0		21.1	(5^-)	(1962JO14, 1964CA07)
(18.6)	450	n, α_0, α_1		(21.2)	(6^+)	(1964CA07, 1964MI08, 1968BL08)
19.37	55	n		21.68		(1968BL08)
19.52	55	n		21.79		(1968BL08)
19.85	60	n		22.04		(1968BL08)
19.89	340	n		22.07		(1968BL08)
19.97	< 150	n		22.13		(1968BL08)
20.49	375	n		22.52		(1968BL08)
20.71	60	n		22.68		(1968BL08)
20.760 ± 5	15 ± 6	p_0, (α_0), α_2		22.721	$0^+; (T = 2)$	(1970NE1H)
(21.2)	680	α_0		(23.1)		(1968AG03, 1969AG06)
21.28	≈ 20	α_0, α_1		23.11		(1970HA15)
21.67	< 40	n		23.40		(1968BL08)
21.85	300	α_0, α_1		23.54		(1955RA1B, 1970HA15)
22.14	120	n		23.75		(1968BL08)
22.32	≈ 25	α_0, α_1		23.89		(1970HA15)
22.37	165	n		23.93		(1968BL08)
30	broad	α_0, α_1		30		(1961MI03)

[a] p_0, α_0, and α_1 correspond to groups to $^{15}N(0)$, $^{12}C(0)$ and $^{12}C^*(4.4)$; $\gamma_{4.4}$ corresponds to the γ-decay of $^{12}C^*(4.4)$; γ_0 corresponds to capture γ-rays.
[b] $\Gamma_\gamma\Gamma_\alpha/\Gamma = 0.2$, 0.7 and 6 eV, respectively for $^{16}O^*(16.40, 18.19, 21.04)$ (1967SU02).