

Table 16.17 from (1993TI07): States of ^{16}O from $^{12}\text{C}(^6\text{Li}, \text{d})$ and $^{12}\text{C}(^7\text{Li}, \text{t})$

E_x^a (MeV \pm keV)	$\Gamma_{\text{c.m.}}^b$ (keV)	$\theta_\alpha^2/\theta_\alpha^2(2^+)^c$	Γ_{α_0}/Γ	$J^\pi; K^\pi$
0		0.93, 0.18		0^+
6.05		0.38, 1.10		$0^+; 0^+$
6.13		0.23, 0.22		3^-
6.92		$\equiv 1.0$		$2^+; 0^+$
7.12		0.53, 0.39		1^-
8.87	< 20			2^-
9.63 ± 30^d	400 ± 10	0.30, 0.60		$1^-; 0^-$
9.84	< 20	$\leq 0.05, \leq 0.01$		2^+
10.346 ± 6^e	35 ± 5	0.25, 0.47	0.86 ± 0.09	$4^+; 0^+$
10.96				0^-
11.10^e	< 30	$\leq 0.06, \leq 0.03$	0.31 ± 0.03 ($J = 4^+$)	$3^+ + 4^+$
11.59 ± 20	700 ± 100	≈ 0.4		$3^-; 0^-$
13.09	≈ 230			1^-
14.363 ± 15	< 120			$> 5, \pi = \text{nat.}$
14.66 ± 20	500 ± 50		1.03 ± 0.1	$5^-; 0^-$
14.82	45 ± 10			(6^+)
16.30 ± 20	300 ± 50		1.07 ± 0.11	$6^+; 0^+$
17.65 ± 50	100 ± 50			
17.85 ± 50	≈ 200			
(18.6) ^f				(5^-)
19.30 ± 50	≈ 200			
20.8 ± 100^e	500 ± 100		1.16 ± 0.23	$7^-; 0^-$
21.6 ± 100	≤ 100		0.67 ± 0.14	6^+
23.0 ± 100	≈ 200			(6^+)
23.8 ± 100	1980 ± 250			(6^+)
26.9 ± 100	1700 ± 250			(7^-)
27.7^f				(7^-)
(29.3) ^f				(7^-)
32^g	broad			
34^h				$10^+(9^-)$
35^g	broad			

^a E_x quoted without errors are from [Table 16.13](#). For the earlier references see [Table 16.14 \(1982AJ01\)](#). Angular distributions are reported in both reactions for the first nine states.

^b Line widths, not corrected for α -penetrabilities.

^c Ratio of dimensionless reduced α -width calculated at a channel radius of 5.4 fm, relative to that for $^{16}\text{O}^*(6.92)$. (N, L) here are taken to be (2, 0) and (4, 1) respectively, for $^{16}\text{O}^*(0, 7.12)$. The first number listed is the value reported at $E(^6\text{Li}) = 42$ MeV, the second at $E(^6\text{Li}) = 90.2$ MeV.

^d On the basis of studies of the $^{12}\text{C}(^6\text{Li}, \text{d})$, $^{12}\text{C}(^7\text{Li}, \text{t})$, $^{12}\text{C}(^{10}\text{B}, ^6\text{Li})$ and $^{19}\text{F}(\text{p}, \alpha)$ reactions, the energy of $^{16}\text{O}^*(9.6)$ is 9619 ± 15 keV with $\Gamma = 400 \pm 100$ keV (line width). $\Gamma_{\text{R}} = 430 \pm 10$ keV as inferred from the best fit B-W line shape. This value is corrected for penetrability ([1981OV02](#); Becchetti, private communication.).

^e Angular distributions are reported at $E(^6\text{Li}) = 35.5 - 35.6$ MeV to $^{16}\text{O}^*(10.36)$ and to the unresolved 3^+ and 4^+ states at 11.1 MeV ([1986AJ04](#)). More recent coincidence measurements ([1986CA19](#)) have indicated that while the 4^+ state is dominantly populated and decays by α emission, the 3^+ state decays by γ emission. Angular correlation measurements ([1980CU08](#)) and analysis ([1988SE07](#)) indicate the the 4^+ state is populated by a two-step process.

^f ([1982AR20](#)); decay primarily by α_0 .

^g ([1982AR20](#)); decay primarily by α_1 .

^h ([1982AR20](#), [1983AR12](#)); decays primarily by α_2 .