Table 16.9 from (1977AJ02): Energy levels of ^{16}O [a]

E_x (MeV ± keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
0	$0^+; 0$		stable		2, 3, 4, 5, 12, 13, 14, 16, 17, 18, 19, 20, 21, 29, 30, 32, 33, 34, 35, 42, 44, 45, 51, 52, 54, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92
6.0494 ± 1.0	$0^+; 0$	0^+	$\tau_m = 96 \pm 7$ psec	π	2, 12, 13, 14, 15, 16, 19, 20, 29, 33, 42, 44, 45, 52, 61, 64, 65, 68, 71, 72, 75, 76, 79, 81, 82, 83, 85, 89, 90
6.13043 ± 0.05	$3^-; 0$		$\tau_m = 26.6 \pm 0.7$ psec $\|g\| = 0.55 \pm 0.03$	γ	2, 12, 13, 14, 16, 19, 20, 30, 33, 42, 43, 44, 45, 51, 52, 61, 62, 63, 64, 65, 67, 68, 71, 72, 75, 76, 79, 80, 81, 82, 83, 85, 86, 89, 90
6.9171 ± 0.6	$2^+; 0$	0^+	$\tau_m = 6.00 \pm 0.03$ fsec	γ	2, 12, 13, 14, 15, 16, 19, 20, 30, 31, 33, 42, 43, 44, 45, 51, 52, 61, 63, 64, 66, 67, 68, 71, 72
7.11685 ± 0.14	$1^-; 0$		$\tau_m = 12.0 \pm 1.2$ fsec	γ	2, 12, 13, 14, 19, 20, 30, 33, 42, 43, 44, 45, 51, 52, 61, 63, 64, 65, 68, 71, 72, 75, 79, 81, 82, 83, 85, 86, 91
8.8719 ± 0.5	$2^-; 0$		$\tau_m = 180 \pm 16$ fsec	γ, α	2, 12, 13, 14, 20, 30, 31, 42, 43, 45, 51, 52, 55, 63, 64, 65, 67, 68, 72, 79, 80, 81, 82, 85, 86, 89
9.632 ± 21	$1^-; 0$	0^-	$\Gamma_{c.m.} = 510 \pm 60$	γ, α	5, 10, 12, 13, 42, 52, 55
9.847 ± 3	$2^+; 0$		0.9 ± 0.3	γ, α	2, 5, 10, 12, 13, 14, 30, 42, 43, 45, 51, 52, 55, 61, 64, 65, 67, 68, 81, 82, 83, 85, 89

Table 16.9 from (1977AJ02): Energy levels of ^{16}O [a] (continued)

E_x (MeV ± keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
10.353 ± 4	$4^+; 0$	0^+	27 ± 4	γ, α	2, 5, 10, 12, 13, 14, 15, 16, 19, 20, 30, 31, 42, 43, 45, 52, 61, 64, 65, 67, 68, 71, 72, 79, 81, 82, 83, 85, 89
10.952 ± 3	$0^-; 0$		$\tau_m = 8 \pm 5$ fsec	γ	42, 51, 52, 64, 65, 81
11.080 ± 3	$3^+; 0$		$\Gamma_{cm} < 12$	γ	2, 42, 45, 51, 52, 81
11.095 ± 2	$4^+; 0$		0.28 ± 0.05	γ, α	2, 5, 10, 12, 13, 16, 20, 30, 31, 42, 43, 45, 64, 65, 67, 68, 72, 85
11.26 [b]	$0^+; 0$		2500	α	10, 52, 82
11.52 ± 4	$2^+; 0$		74 ± 4	γ, α	2, 5, 10, 42, 61, 64, 65, 67, 68
11.60 ± 20	$3^-; 0$	0^-	800 ± 10	α	10, 13
12.053 ± 3	$0^+; 0$		1.5 ± 0.5	γ, α	10, 42, 61, 64, 65, 67, 68, 82
12.442 ± 5	$1^-; 0$		98 ± 7	γ, p, α	5, 7, 10, 42, 46, 47, 50, 51, 52, 65, 68
12.530 ± 1	$2^-; 0$		0.8	γ, p, α	2, 42, 46, 47, 50, 51, 52, 61, 64, 65, 68
12.797 ± 5	$0^-; 1$		38 ± 4	p	42, 47, 51, 52
12.9686 ± 0.6	$2^-; 1$		1.9 ± 0.2	γ, p, α	42, 46, 47, 50, 51, 52, 61, 79, 80, 81
13.02 ± 10	2^+		150 ± 11	γ, p, α	2, 5, 10, 47, 50, 61, 64, 65, 67, 68
13.094 ± 7	$1^-; 1$		130 ± 5	γ, p, α	5, 7, 10, 41, 42, 46, 47, 50, 51, 52, 61, 81
13.129 ± 10	$3^-; 0$		110 ± 30	γ, p, α	2, 5, 7, 10, 41, 43, 51, 52, 68
13.254 ± 5	$3^-; 1$		21 ± 1	γ, p, α	5, 7, 10, 42, 47, 50, 51, 52, 64, 79, 80, 81, 83
13.664 ± 3	$1^+; 0$		64 ± 3	γ, p, α	42, 46, 47, 50, 65
13.875 ± 6	$4^+; 0$		75 ± 7	α	2, 10, 42, 50, 68
13.979 ± 3	2^-		22 ± 2	p, α	2, 42, 43, 47, 50, 64, 67, 69
14.032 ± 15	0^+		185 ± 35	γ, α	10, 61
14.1 ± 100	3^-		750 ± 200	α	10
14.30 ± 20			< 30		13, 30, 43
14.400 ± 3	≥ 5		≤ 30		2, 13, 30, 42, 43
(14.52)					30

Table 16.9 from (1977AJ02): Energy levels of ^{16}O [a] (continued)

E_x (MeV ± keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
14.63 ± 40	4^+		500 ± 100	α	10
14.67 ± 40	5^-	0^-	560 ± 75	α	10, 12, 13, 16, 20, 30
14.815 ± 2	$6^+; 0$		67 ± 8	α	2, 10, 30, 31, 43, 68
14.922 ± 6	4^+		51 ± 7	p, α	2, 41, 42, 47, 50, 67, 68
15.107 ± 50	0^+		190 ± 30	α	10, 31, 43
15.22 ± 35	2^-		70 ± 14	p, α	47, 50, 79
15.25 ± 50	2^+; (0)		650 ± 100	γ, p, α	46, 47, 50, 61
15.405 ± 20	$3^-; 0$		95 ± 15	p, α	7, 10, 41, 43, 47, 50, 64, 68, 79
15.8	3^-		≈ 400	α	10
15.838 ± 15			≤ 80		2, 42, 43
15.9	2^+		≈ 600	γ, α	5
16.214 ± 15	(4^+)		96 ± 16		2, 43
16.22 ± 15	$1^+; 1$		18 ± 3	γ, n, p	46, 47, 48, 61
16.29 ± 15	6^+	0^+	370 ± 40	α	10, 12, 13, 15, 16, 20, 31, 41, 42, 82, 83
16.42 ± 25	2^+		35 ± 5	γ, n, p, α	5, 6, 7, 10, 31, 61, 64, 67, 68
16.8 ± 100			≤ 100	γ	61
16.9	5^-		700	α	10
(16.94)	2^+		≈ 280	α, ^{8}Be	11
(17.0)	$1^-; 1$		≈ 1400	γ, p	46
17.14 ± 15	$1^-; 1$		36 ± 5	γ, n, p, α	6, 7, 10, 43, 46, 47, 48, 52, 61
17.200 ± 20	2^+		160 ± 60	α, ^{8}Be	2, 11, 42, 43, 52, 64, 67, 68
17.29 ± 15	$1^-; 1$		90 ± 10	γ, n, p, α	6, 10, 46, 47, 48
17.55	(4^+)		165	n, α	6, 10
17.64 ± 15	$(2^-); 1$		59 ± 10	γ, n, p, α	7, 10, 48, 61
(17.7)	$0^+, 2^+$			α, ^{8}Be	11
17.85 ± 20	4^+		100 ± 10	n, p, α, ^{8}Be	2, 6, 10, 11, 42, 48, 64
18.018 ± 15	$4^+; 0$		14	(γ), p, α, ^{8}Be	7, 10, 11, 42, 46, 48
18.06 ± 15	$(2^+, 4^+); 1$		26 ± 5	(γ), n, p, α	6, 10, 46, 47, 48
18.15 ± 30	$(2^+; 0)$		260 ± 50	(γ), n, p	5, 6, 48, 64, 67, 68
18.29			280	γ, p, α	5, 7, 10
18.4	5^-		510	α	10
18.48 ± 25	2^+		60 ± 9	γ, n, p, α, ^{8}Be	2, 11, 48, 61, 64, 67, 68

Table 16.9 from (1977AJ02): Energy levels of ^{16}O [a] (continued)

E_x (MeV ± keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
18.6	$(1^-, 5^-)$		140	α	10, 48
18.69 ± 30	$3^-; 0$		280 ± 80		48, 64, 68
(18.75)	(1^-)		55	α	10
18.80	(4^+)		220	n, p, α, ^{8}Be	6, 7, 10, 11
18.94 ± 30	2, 4		< 16	γ, p	2, 46, 81
18.99 ± 30	$3^-; 1$		240	γ, p	46, 68
19.09 ± 30	$2^+; (1)$		120	γ, p	46, 47, 67
19.10 ± 50	$(4^+; 1)$		41	n, (α)	6, 10, 64
19.24 ± 20	$2^-; 1$		90 ± 10	γ, n, p, α	6, 10, 46, 48, 64
(19.34)	6^+		50	^{8}Be	11
(19.39)	$(4^+, 0^+)$		23	α	10
19.48 ± 25	$1^-; 1$		250 ± 60	γ, n, p, α	10, 46, 47, 48, 61
19.55 ± 30	$(3^-; 0)$		240	n, α	2, 6, 10, 64, 68
19.89 ± 20	3; 0		100 ± 30	γ, n, p	2, 46, 48, 80
19.91 ± 20	(4^+)		825	α	10
19.98	$(2^+, 0^+, 1^-)$		140	α	10
20.15 ± 100	$2^+; 0$		350 ± 50	γ, n, α	5, 6, 67, 68
20.3			≈ 1500	p, α	7
20.36 ± 70	$2^-; 1$		500 ± 100	γ	61
20.43 ± 20	≥ 2		150 ± 30	γ, n, p, α	6, 46, 48
(20.47)	(4^+)		110	α	10
20.54 ± 15	≥ 1		140 ± 30	n, p, α	2, 10, 47, 48, 64
20.81			< 25	n, α	6
20.88 ± 60	7^-	0^-	650 ± 75	α	7, 9, 10, 11, 13
20.9 ± 100	$2^+; 0$		350 ± 50		10, 12, 13, 16
20.945 ± 20	$1^-; 1$		300 ± 10	γ, n, p	47, 48, 61
21.0	(5^-)		900	α	10
(21.01)			55	n, α	6
21.03 ± 25	1^-		255 ± 60	γ, α	5, 64, 68
(21.1)	(6^+)		450	n, α	6, 10
21.175 ± 15					2
21.50	$(1 \rightarrow 4)$		120	p	47
21.67	$(T = 0)$		< 50	n, p, α	6, 47, 50
21.82 ± 70	$2^+; 0$		400 ± 50		64, 68
21.84 ± 25	6		55	n, α	2, 6, 12
22.04			60	n, d, α	6, 36
(22.07)			340	n, α	6

Table 16.9 from (1977AJ02): Energy levels of ^{16}O [a] (continued)

E_x (MeV ± keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
22.146 ± 20	$1^-; 1$		675 ± 10	γ, n, p	46, 47, 48
22.2 ± 100			< 150	γ, n, d, α, ^{8}Be	6, 11, 35, 40
22.35				n, d, α	36, 40
22.46 ± 70	$(2^+, 3^-); 0$		450 ± 50	n, d, α	6, 40, 64, 68
22.65 ± 30			60	n, α, ^{8}Be	2, 6, 11
22.721 ± 3	$0^+; T = 2$		12.5 ± 2.5	n, p, d, α	6, 7, 10, 33, 37, 40, 82
22.87 ± 30	$1^-; 1$		300 ± 15	γ, p, d	35, 46, 47
23.1	6^+		$\lesssim 500$	d, α, ^{8}Be	11, 38
23.11			≈ 20	d, α, ^{8}Be	10, 11, 40
23.22 ± 70	$2^+; 0$		400 ± 50		64, 68
23.50 ± 150			1700 ± 300	α	10, 68
23.51 ± 30			300	p, d, α	2, 10, 37, 38
23.85 ± 100	$(2^+, 0^+); 0$		400 ± 50	n, α	6, 68
23.879 ± 6	6^+		26 ± 4	p, α, ^{8}Be	7, 10, 11
24.0 ± 100			1200 ± 300		64
24.065 ± 35	$1^-; 1$		550 ± 40	γ, p, ^{3}He, α, ^{8}Be	11, 21, 46
24.4 ± 100	$(2^+, 3^-)$		400 ± 50	α	10, 68
24.522 ± 11	$2^+; 2$		< 50		33, 82
24.77 ± 60	$(2^+, 4^+; 1)$		340 ± 60	γ, n, p, d, ^{3}He, α	27, 36, 37, 46
25.12 ± 50	$1^-; 1$		2900 ± 300	γ, p, ^{3}He, α	10, 21, 46, 60
25.50 ± 150	$1^-; 1$		1330 ± 300		64
25.6	$(3^-); 1$		≈ 350	^{3}He, α	10, 27
26.1 ± 100	$T = 1$		450	γ d,, ^{3}He, α	10, 21, 27, 38, 40
26.3	2^+		1200	α	10
26.42 ± 80	$(2)^+; 1$		530 ± 80	γ, p, ^{3}He	21, 46
27.0	$(T = 1)$		broad	d, ^{3}He, α	27, 40
27.4 ± 100	$(2^+, 4^+; 1)$		825 ± 110	γ, p, d, ^{3}He, α, ^{8}Be	27, 28, 38, 46
27.6	$(3^-; 0)$		≈ 500	p, d, ^{3}He, α	23, 26, 27, 38
29.7			broad	d, α	10, 38
31.8 ± 600				γ	60
≈ 35	3^-		≈ 5000		64

[a] See also Tables 16.15 and 16.21.
[b] Calculated from E_x of ^{16}O*(6.13) and the ΔE of 81.0 ± 1.0 keV between ^{16}O*(6.05, 6.13) (C.P. Browne, private communication).