Table 16.18 from (1986AJ04): Levels of ^{16}O from ^{15}N(p, γ), ^{15}N(p, p) and ^{15}N(p, α)

No.	E_p (keV)	Γ_{γ_0} (eV)	Γ_{γ_1} (eV)	Γ_p (keV)	$\Gamma_p\Gamma_\gamma/\Gamma$ (eV)	Γ_{α_0} (keV)	Γ_{α_1} (keV)	Γ_{lab} (keV)	$J^\pi; T$	E_x (MeV $\pm$ keV)
1	335 ± 4 [a]	12 ± 2	0.12 ± 0.04	0.9 ± 0.1		102 ± 4	0.025	110 ± 4	$1^-; 0$	12.442
2	429 ± 1	$(21 \pm 6) \times 10^{-3}$	2.1 ± 0.2	0.025 ± 0.003 [b]		nr	0.072 ± 0.010 [b]	0.103 ± 0.011 [b]	$2^-; 0$	12.530
3	710 ± 7			40		nr		40 ± 4	$0^-; 1$	12.793
4	897.37 ± 0.29	$(78 \pm 16) \times 10^{-3}$		0.99 ± 0.12 [b]		nr	0.60 ± 0.08 [b]	1.70 ± 0.15 [b]	$2^-; 1$	12.9686
5	1028 ± 10	32 ± 5		100		40	r	140 ± 10	$1^-; 1$	13.091
6	1050 ± 150					$\Gamma_p\Gamma_{\alpha_0} = 500$ keV^2			2^+	13.1
7	1210 ± 3			4.1		r	8.2 ± 1.1	22.5 ± 1	$3^-; 1$	13.262
8	1640 ± 3	< 1 [c]		10		nr	59 ± 6	68 ± 3	$1^+; 0$	13.664
9	1890 ± 20			0.5		r	(r)	90 ± 2		13.90
10	1979 ± 3			r		nr	r	23 ± 2	2^-	13.982
11	2982 ± 6 [d]			20 ± 3 [e]		1.5	30 [f]	55 ± 5 [d]	2^+	14.921 [k]
12	3170 [g]			12 [h]		152	163	330 ± 100	0^+	15.10 [k]
13	3264 ± 11 [d]			[i]		nr	7 [j]	67 ± 4 [d]	2^-	15.186 [k]
14	3340 [g,l]			15 [h]		12	182	315 ± 100	2^+; (0)	15.26 [k]
15	3499 ± 8 [d,l]			15 ± 5 [e]		103	1	131 ± 18 [d]	3^-	15.406 [k]
16	4350 ± 90 [e]			210 ± 38 [e]				620 ± 60 [e]	$1^-; 0$	16.20
17	4357 ± 5 [d]	3.7 ± 0.5 [m]	0.44 ± 0.06 [m]	7 ± 3 [e]	2.70 ± 0.25 [c]			20 ± 3 [d]	$1^+; 1$	16.210
18	4505 ± 12 [e]			53 ± 12 [e]				65 ± 8 [e]	$0^+; 0$	16.349
19	4612 ± 9 [c]			r	1.11 ± 0.24 [n]	r	r	26 ± 8 [c]	$1 - 4; 1$ [c]	16.449
20	5001 ± 5 [d,l]			7 ± 2 [e]	[o]	nr	r	28 ± 4 [d]	$3^+; 0 + 1$ [c]	16.813
21	5300 ± 40 [e]	r		[p]				405 ± 43 [d]	1^-;1	17.09
22	5329 ± 5 [d]	6.7 ± 1.0	1.00 ± 0.17 [m]	22 [c]	3.90 ± 0.50 [c]			33 ± 4 [d]	1^+;1	17.120
23	5487 ± 9 [d]	67		45	[q]			80 ± 8 [d]	$1^-; 1$	17.268
24	5848 ± 8 [e]			37 ± 8 [e]				117 ± 15 [e]	2^+; (1)	17.607
25	6100 ± 100 [e]			500 ± 100 [e]				875 ± 110 [e]	2^-	17.84
26	6137 ± 6 [d]			6 [c]	(r)		r	26 ± 3 [d]	$1^-, 2^-; 1$	17.877
27	6297 ± 6 [d]	nr	4.8 ± 1.9 [s]	13 ± 3 [e,t]			8.9 ± 3.2 [c]	28 ± 6	$3^-; 1$ [x]	18.027
28	6490 ± 15 [e]			33 ± 12 [e]				150 ± 26	2^+	18.208
29	6727 ± 15 [e]			11 ± 6				97 ± 41	2^+	18.430
30	6785 ± 6 [e]			17 ± 3				37 ± 6	1^-	18.484
31	7100 ± 100 [c]	≥ 3.6 [m]		[u]					$1^+; 1$	18.78
32	7313 ± 9 [c]		7.1 ± 3.1 [v]	[w]	[w]		0.57 ± 0.49 [c]	8.7 ± 4.1 [c]	$4^-; 1$ [x]	18.979
33	7330 ± 30	38		≤ 130	$\geq 1.8 \pm 0.3$			≈ 260	1^+	18.99
34	7420	r		≈ 30				≈ 130	2^+; (1)	19.08
35	7600 ± 30 [y]	nr	1.5 [z]					100	(2, 3; 1)	19.25
36	7840 ± 30 [y]			(r)				350	$1^-; 1$	19.47

Table 16.18 from (1986AJ04): Levels of ^{16}O from ^{15}N(p, γ), ^{15}N(p, p) and ^{15}N(p, α) (continued)

No.	E_p (keV)	Γ_{γ_0} (eV)	Γ_{γ_1} (eV)	Γ_p (keV)	$\Gamma_p\Gamma_\gamma/\Gamma$ (eV)	Γ_{α_0} (keV)	Γ_{α_1} (keV)	Γ_{lab} (keV)	$J^\pi; T$	E_x (MeV $\pm$ keV)
37	8289 ± 7 [c]	nr	17 ± 6 [aa]	25 ± 10 [bb]	[cc]		r	45 ± 10	3; 1 [c]	19.893
38	8843 ± 17 [c]	nr	38 [dd]	[dd]	[dd]			200 ± 20	$1-4$; 1	20.412
39	8990			[ee]				160		20.55
40	9410 [g]	170		[ee]	21 ± 1			320 ± 10	1^-; 1	20.945 ± 20
41	10000 [g]			[gg]				130	$1 \rightarrow 4$	21.50
42	10180 [g]			[hh]		r		< 45	$T = 0$	21.66
43	10700 [g,ff]	r		[gg]	488 ± 20			730 ± 10	1^-; 1	22.150 ± 10
44	11490 [g]	120	27 [z]	[gg]	69 ± 5			320 ± 10	1^-; 1	22.89 ± 10
45	12740 [g]	r			130 ± 13			590 ± 40	1^-; 1	24.07 ± 30
46	13490 ± 60		230 ± 90, or 130 ± 50 [ii]	85 [bb]				360 ± 60	$(2, 4)^+$; 1	24.76
47	13870 [g]	r			651 ± 117		[jj]	3150 ± 320	1^-; 1	25.12 ± 60
48	15250 ± 80		740 ± 240, or 410 ± 140 [ii]	122 [bb]			[jj]	565 ± 85 [kk]	$(2, 4)^+$; 1	26.41
49	16250 ± 100		1070 ± 380, or 590 ± 10 [ii]	206 [bb]			[jj]	880 ± 125	$(2, 4)^+$; 1	27.35

nr = non-resonant

r = resonant

For earlier references see Tables 16.21 in (1971AJ02), 16.19 in (1977AJ02) and 16.18 in (1982AJ01).

[a] (1982RE06).

[b] (1983LE25).

[c] See (1983SN03).

[d] Weighted mean of values obtained by (1983SN03, 1984DA18) and in earlier work [see (1982AJ01)].

[e] (1984DA18). See also for calculated Γ_n.

[f] $\Gamma_p\Gamma_{\alpha_1}/\Gamma = 16.4$ keV (1983SN03).

[g] Nominal E_p calculated from E_x.

[h] Not observed in p_0 channel.

[i] 35 ± 3 keV ($s = 1$), 15 ± 2 keV ($s = 0$); $\Gamma_p/\Gamma = 0.78$ (1984DA18).

[j] $\Gamma_p\Gamma_{\alpha_1}/\Gamma = 10.9$ keV (1983SN03).

[k] See also footnote [c] in Table 16.18 (1982AJ01).

[l] Broad structures have also been observed at $E_{\rm p} \approx 3.5$ MeV in $(\alpha_1\gamma)$ and at 5.7 MeV in $(\alpha_1\gamma)$ and (γ_{1+2}) (1983SN03).

[m] Γ_γ uncertainties neglect the error in $\Gamma_{\rm p}/\Gamma$ (1983SN03).

[n] $\Gamma_{\rm p}\Gamma_{\gamma_2}/\Gamma$; also $\Gamma_{\gamma_2} \approx 11$ eV (1983SN03).

[o] $\Gamma_{\rm p}\Gamma_{\gamma_2}/\Gamma = 0.48 \pm 0.09$ eV, $\Gamma_{\rm p}\Gamma_{\gamma_{3+4}}/\Gamma = 0.62 \pm 0.13$ eV, $\Gamma_{\rm p}\Gamma_{\alpha_1}/\Gamma = 6.8$ eV; $\Gamma_{\gamma_2} = 1.0$ eV, $\Gamma_{\gamma_3} = 1.2$ eV, $\Gamma_{\rm p}/\Gamma = 0.5$ [see, however, values shown for $\Gamma_{\rm p}$ and Γ] (1983SN03).

[p] $\Gamma_{\rm p} = 24 \pm 6$ ($l = 0$), 246 ± 24 keV ($l = 2$) (1984DA18).

[q] $\Gamma_{\gamma_3} = 8$ eV, $\Gamma_{\rm p}\Gamma_{\gamma_3}/\Gamma = 3.27 \pm 0.41$ eV (1983SN03).

[r] $\Gamma_{\gamma_4} = 2$ eV, $\Gamma_{\rm p}\Gamma_{\gamma_4}/\Gamma = 0.69 \pm 0.10$ eV, $\Gamma_{\rm p}\Gamma_{\alpha_1}/\Gamma = 1.48$ keV (1983SN03).

[s] Γ_{γ_2}; $\Gamma_{\gamma_3} = 0.76 \pm 0.39$ eV: see (1983SN03).

[t] $\Gamma_{\rm p_0} = 7.8 \pm 2.8$ keV, $\Gamma_{\rm p_{1+2}} = 2.7 \pm 1.2$ keV; $\Gamma_{\rm p}\Gamma_{\gamma_2}/\Gamma = 1.96 \pm 0.27$ eV, $\Gamma_{\rm p}\Gamma_{\gamma_{3+4}}/\Gamma = 0.31 \pm 0.11$ eV, $\Gamma_{\rm p}\Gamma_{\rm p_{1+2}}/\Gamma = 1.11 \pm 0.26$ keV, $\Gamma_{\rm p}\Gamma_{\alpha_1}/\Gamma = 4.25 \pm 1.00$ keV: see (1983SN03).

[u] $\Gamma_{\rm p}/\Gamma \leq 0.5$, $\Gamma_{\rm p}\Gamma_{\gamma_0}/\Gamma \geq 1.8 \pm 0.3$ eV (1983SN03).

[v] Γ_{γ_2}; $\Gamma_{\gamma_3} < 0.3$ eV: see (1983SN03).

[w] $\Gamma_{\rm p_0} = 0.98 \pm 0.19$ keV, $\Gamma_{\rm p_{1+2}} = 5.2 \pm 2.3$ keV; $\Gamma_{\rm p}\Gamma_{\gamma_2}/\Gamma = 0.85 \pm 0.01$ eV, $\Gamma_{\rm p}\Gamma_{\gamma_{3+4}}/\Gamma < 0.03$ eV, $\Gamma_{\rm p}\Gamma_{\rm p_{1+2}}/\Gamma = 0.62 \pm 0.09$, $\Gamma_{\rm p}\Gamma_{\alpha_0}/\Gamma < 0.09$ keV: see (1983SN03).

[x] See also Table IV in (1983SN03).

[y] See also (1983SN03).

[z] $\gamma_1 + \gamma_2$.

[aa] Γ_{γ_2} (1977CH19). See also (1983SN03).

[bb] $\Gamma_{\rm p_0}$ based on $\Gamma_{\rm c.m.}$ and values of $\Gamma_{\rm p_0}/\Gamma$ assumed by (1977CH19).

[cc] $\Gamma_{\rm p}\Gamma_{\gamma_2}/\Gamma = 3.9 \pm 0.56$ eV, $\Gamma_{\rm p}\Gamma_{\rm p_{1+2}}/\Gamma = 4.48$ keV, $\Gamma_{\rm p}\Gamma_{\rm p_3}/\Gamma = 0.52$ keV, $\Gamma_{\rm p}\Gamma_{\alpha_1}/\Gamma = 1.07$ keV (1983SN03).

[dd] $\Gamma_{\gamma_2} = 38$ eV; $\Gamma_{\rm p}\Gamma_{\gamma_2}/\Gamma = 18.8 \pm 3.9$ eV, $\Gamma_{\rm p}\Gamma_{\rm p_{1+2}}/\Gamma = 15.8$ keV, $\Gamma_{\rm p}\Gamma_{\rm p_3}/\Gamma = 5.8$ keV, $\Gamma_{\rm p}\Gamma_{\rm n_0}/\Gamma = 22$ keV; the state is probably 4^+; $T = 1$: see (1983SN03).

[ee] Resonant in $\rm p_2$.

[ff] $\sigma = 12.9$ mb at peak of GDR (1978OC01).

[gg] Resonant in $\rm p_1$.

[hh] Resonant in $\rm p_0$, $\rm p_1$, $\rm p_6$.

[ii] Γ_{γ_2} (eV).

[jj] Apparent resonance in yield of $(\alpha\gamma_{15.1})$ (1978OC01).

[kk] Average of values obtained in this experiment and in ^{12}C(α, γ_2).