

Table 17.20 from (1971AJ02): Resonances in  $^{16}\text{O}(p, p)^{16}\text{O}$  and  $^{16}\text{O}(p, \alpha)^{13}\text{N}$ 

$E_p$ (MeV $\pm$ keV)	$\Gamma_{\text{lab}}$ (keV)	Particles out	$^{17}\text{F}^*$ (MeV)	$J^\pi, T$	Refs.
2.663 $\pm$ 7 <sup>a</sup>	20 $\pm$ 1	p <sub>0</sub>	3.105	$\frac{1}{2}^-$	(A, 1962SA1C, 1965BL02, 1965GO08)
3.47	1.63 $\pm$ 0.2	p <sub>0</sub>	3.86	$\frac{5}{2}^-$	(A, 1962SA1C, 1964SI04, 1965BL02)
4.354 $\pm$ 10	240	p <sub>0</sub>	4.696	$\frac{2}{2}^-$	(A, 1962HA37, 1962SA11, 1962SA1C, 1965BL02)
4.787 $\pm$ 10	1630	p <sub>0</sub>	5.103	$\frac{2}{2}^+$	(A, 1962HA37, 1962SA11, 1962SA1C, 1965BL02)
5.231 $\pm$ 10	72.5	p <sub>0</sub>	5.521	$\frac{2}{2}^-$	(A, 1962HA37, 1962SA11, 1962SA1C, 1965BL02)
5.392 $\pm$ 10	42.9	p <sub>0</sub>	5.672	$\frac{7}{2}^-$	(A, 1962HA37, 1962SA11, 1962SA1C)
5.402 $\pm$ 10	< 0.6	p <sub>0</sub>	5.681	$\frac{2}{2}^+$	(A, 1962SA11, 1962SA1C)
5.546 $\pm$ 10	191	p <sub>0</sub>	5.817	$\frac{3}{2}^+$	(A, 1962HA37, 1962SA11, 1962SA1C, 1965BL02)
5.779 $\pm$ 10	30	p <sub>0</sub>	6.036	$\frac{2}{2}^-$	(A, 1962SA11, 1962SA1C)
6.332 $\pm$ 10	216	p <sub>0</sub>	6.556	$\frac{1}{2}^+$	(1962SA11, 1962SA1C)
6.484 $\pm$ 10	< 3	p <sub>0</sub>	6.699	$\frac{2}{2}^-$	(A, 1962SA11, 1962SA1C)
6.564 $\pm$ 10	4.8	p <sub>0</sub>	6.774	$\frac{3}{2}^+$	(A, 1962SA11, 1962SA1C, 1965BL02)
6.833 $\pm$ 10	4.0	p <sub>0</sub> , $\gamma_{6.13}$	7.027	$\frac{2}{2}^-$	(1961ST17, 1962SA11, 1962SA1C, 1962ST1A, 1965BL02)
7.183 $\pm$ 10	10 $\pm$ 2	p <sub>0</sub> , p <sub>2</sub> , $\alpha_0$	7.356	$\frac{2}{2}^+$	(1960KO09, 1962SA11, 1962SA1C, 1964DA02, 1965BL02)
7.280 $\pm$ 7	$\leq$ 5	p <sub>0</sub>	7.448	$\frac{2}{2}^-$	(1962SA11, 1962SA1C, 1964DA02)
7.287 $\pm$ 7	7 $\pm$ 2	p <sub>0</sub> , p <sub>1</sub> , p <sub>2</sub> , $\alpha$	7.454	$\frac{2}{2}^-$	(1962SA11, 1962SA1C, 1964DA02)
7.305 $\pm$ 7	5 $\pm$ 2	p <sub>0</sub> , p <sub>2</sub>	7.471	$\frac{2}{2}^-$	(1962SA11, 1962SA1C, 1964DA02)
7.313 $\pm$ 10	845	p <sub>0</sub>	7.478	$\frac{2}{2}^+$	(1962SA11, 1962SA1C, 1964DA02)
7.385 $\pm$ 10	30	p <sub>0</sub> , p <sub>2</sub> , $\gamma_{6.13}$	7.546	$\frac{7}{2}^-$	(1961ST17, 1962SA11, 1962SA1C, 1962ST1A, 1964DA02)
7.60 $\pm$ 20	190 $\pm$ 3	p <sub>0</sub> , p <sub>1</sub> , $\alpha_0$	7.75	$\frac{1}{2}^+$	(1962SA11, 1962SA1C, 1964DA02)
7.81 $\pm$ 15	10 $\pm$ 3	p <sub>2</sub>	7.95	$\frac{2}{2}^-$	(1964DA02)
7.88 $\pm$ 20	50 $\pm$ 20	p <sub>0</sub> , $\gamma_{6.13}$ , $\gamma_{6.92}$ , $\alpha_0$	8.01	$\frac{2}{2}^-$	(1961ST17, 1962SA11, 1962SA1C, 1962ST1A, 1964DA02)
7.94 $\pm$ 15	110 $\pm$ 20	p <sub>0</sub> , p <sub>1</sub> , $\alpha_0$	8.07	$\frac{5}{2}^+$	(1962SA11, 1962SA1C, 1964DA02)
8.1	750 $\pm$ 250	(p <sub>0</sub> ), p <sub>1</sub> , $\alpha_0$	8.2	$\frac{2}{2}^-$	(1964DA02)
8.275 $\pm$ 5	12 $\pm$ 5	p <sub>0</sub> , p <sub>1</sub> , p <sub>2</sub> , p <sub>3</sub> , $\alpha_0$	8.383	$\frac{2}{2}^-$	(1962SA11, 1962SA1C, 1964DA02)
8.310 $\pm$ 10	45 $\pm$ 10	p <sub>0</sub> , p <sub>1</sub> , p <sub>2</sub> , p <sub>3</sub> , $\gamma_{6.13}$ , $\gamma_{6.92}$ , $\alpha_0$	8.416	$\frac{2}{2}^+$	(1961ST17, 1962SA11, 1962SA1C, 1962ST1A, 1964DA02, 1965BL02)
8.66 $\pm$ 30 <sup>b</sup>	180 $\pm$ 30	p <sub>2</sub> , p <sub>3</sub> , p <sub>4</sub> , $\alpha_0$	8.75	$\frac{2}{2}^+$	(1963HA04, 1964DA02)

Table 17.20 from (1971AJ02): Resonances in  $^{16}\text{O}(\text{p}, \text{p})^{16}\text{O}$  and  $^{16}\text{O}(\text{p}, \alpha)^{13}\text{N}$  (continued)

$E_p$ (MeV $\pm$ keV)	$\Gamma_{\text{lab}}$ (keV)	Particles out	$^{17}\text{F}^*$ (MeV)	$J^\pi, T$	Refs.
8.88 $\pm$ 20	130 $\pm$ 20	$\text{p}_0 \rightarrow \text{p}_4, \alpha_0, \gamma_{6.13}, \gamma_{6.92}$	8.95	$\frac{5}{2}^-$	(1961ST17, 1962ST1A, 1963HA04, 1964DA02)
9.2 $\pm$ 150 <sup>b</sup>	220 $\pm$ 40	$\text{p}_0 \rightarrow \text{p}_4, \alpha_0, \gamma_{6.13}, \gamma_{6.92}$	9.3	$\frac{3}{2}^+$	(1961ST17, 1962ST1A, 1963HA04, 1964DA02)
9.59 $\pm$ 20	330 $\pm$ 75	$\text{p}_0, \text{p}_1, \text{p}_4$	9.62		(1964DA02)
9.87 $\pm$ 20	140 $\pm$ 20	$\text{p}_0, \text{p}_2, \alpha_0$	9.88		(1964DA02)
9.92 $\pm$ 20	450 $\pm$ 100	$\text{p}_3$	9.93		(1964DA02)
10.04 $\pm$ 20	300 $\pm$ 100	$\text{p}_0, \text{p}_1$	10.04	$\frac{7}{2}$	(1963HA04, 1964DA02)
10.23 $\pm$ 20	270 $\pm$ 85	$\alpha_0$	10.22		(1964DA02)
10.42 $\pm$ 20	170 $\pm$ 40	$\text{p}_1, \text{p}_3$	10.40		(1964DA02)
10.52 $\pm$ 20	150 $\pm$ 30	$\text{p}_0, \text{p}_2, \alpha_0$	10.49	$\frac{7}{2}^-$	(1963HA04, 1964DA02, 1965TO03)
(10.74 $\pm$ 20)	150 $\pm$ 30	$\text{p}_1, \alpha_0$	(10.70)		(1964DA02)
10.83 $\pm$ 20	130 $\pm$ 40	$\text{p}_0, \text{p}_2, (\text{p}_3), (\alpha_0)$	10.79		(1963HA04, 1964DA02)
11.00 $\pm$ 20	200 $\pm$ 50	$(\text{p}_2), \text{p}_3, (\alpha_0)$	10.95		(1963HA04, 1964DA02)
11.276 $\pm$ 8 <sup>c</sup>	< 2	$\text{p}_0 \rightarrow \text{p}_5, \alpha_0$	11.204	$\frac{1}{2}^-; \frac{3}{2}$	(1967PA17, 1967VA1H, 1968TE1C) <sup>d</sup>
11.52 $\pm$ 20	260 $\pm$ 60	$\text{p}_2, \alpha_0$	11.43		(1963HA04, 1964DA02)
11.67 $\pm$ 40 <sup>b</sup>	170 $\pm$ 30	$\text{p}_0, \text{p}_3$	11.57		(1963HA04, 1964DA02)
(11.89 $\pm$ 20)	200 $\pm$ 100	$\text{p}_2$	(11.78)		(1964DA02)
(11.98 $\pm$ 20)	40 $\pm$ 20	$\alpha_0$	(11.87)		(1964DA02)
12.12 $\pm$ 20	130 $\pm$ 40	$\text{p}_2, \alpha_0$	12.00		(1963HA04, 1964DA02)
(12.32 $\pm$ 20)	170 $\pm$ 60	$(\text{p}_2), \alpha_0$	(12.19)		(1964DA02)
12.39 $\pm$ 20	200 $\pm$ 50	$\text{p}_0, \text{p}_2$	12.25	$\frac{3}{2}^-$	(1963HA04, 1964DA02, 1965TO03)
12.49 $\pm$ 20	280 $\pm$ 50	$\text{p}_1, \text{p}_4$	12.35		(1963HA04, 1964DA02)
12.714 $\pm$ 8	$\leq 3$	$\text{p}_0, \text{p}_1, \text{p}_2, \text{p}_4, \text{p}_5, \alpha_0$	12.556	$\frac{3}{2}^-; \frac{3}{2}$	(1963HA04, 1964DA02, 1967PA17, 1967VA1H, 1968TE1C)
( $\approx 13.$ )	$\approx 4000$	$\text{p}_0$	(12.8)		(1960KO09)
13.250 $\pm$ 4	$\leq 4$	$\text{p}_0 \rightarrow \text{p}_5, \alpha_0$	13.060	$T = \frac{3}{2}$	(1963HA04, 1964DA02, 1967VA1H, 1968TE1C, 1969SK1B) <sup>e</sup>
13.273 $\pm$ 5	$\leq 5$	$\text{p}_0 \rightarrow \text{p}_4, \alpha_0$	13.082	$T = \frac{3}{2}$	(1969SK1B)
(13.35)	$\approx 450$	$\text{p}_0$	(13.15)		(1964DA07)
(13.9)	$\approx 350$	$\text{p}_0$	(13.7)		(1964DA07, 1964KE01)

Table 17.20 from (1971AJ02): Resonances in  $^{16}\text{O}(p, p)^{16}\text{O}$  and  $^{16}\text{O}(p, \alpha)^{13}\text{N}$  (continued)

$E_p$ (MeV $\pm$ keV)	$\Gamma_{\text{lab}}$ (keV)	Particles out	$^{17}\text{F}^*$ (MeV)	$J^\pi; T$	Refs.
14.015 $\pm$ 5	$\approx$ 11	$p_0 \rightarrow p_4, \alpha_0$	13.779	$T = \frac{3}{2}$	(1969SK1B)
14.579 $\pm$ 7	$\approx$ 15	$p_0 \rightarrow p_5, \alpha_0$	14.310	$T = \frac{3}{2}$	(1961HI09, 1967VA1H, 1968TE1C, 1969SK1B) <sup>e</sup>
14.8	$\approx$ 700	$p_0, p_{1+2}$	14.5		(1960KO09, 1964DA07, 1964KE01)
15.1	$\approx$ 600	$p_{1+2}$	14.8		(1964DA07)
(15.5)	$\approx$ 550	$p_0, p_{1+2}, p_{3+4}, p_5$	(15.2)		(1964DA07)
15.9	$\approx$ 550	$p_0, p_{1+2}$	15.6		(1964DA07, 1964KE01)
(16.4)	$\approx$ 400	$p_0, p_{1+2}, p_{3+4}, p_5$	(16.0)		(1964DA07)
(16.9)	$\approx$ 550	$p_0$	(16.5)		(1964DA07)
(17.1)	$\approx$ 450	$p_{1+2}$	(16.7)		(1964DA07)
(17.45)	$\approx$ 450	$p_0, p_{3+4}$	(17.02)		(1964DA07)
17.6	$\approx$ 500	$p_0, p_{3+4}$	17.2	$\frac{5}{2}^-$	(1964DA07, 1969KA14)
17.9	$\approx$ 450	$p_0, p_{3+4}, p_5$	17.4		(1964DA07, 1964KE01)
(18.15)	$\approx$ 450	$p_0, p_{1+2}$	(17.67)		(1964DA07)
(18.4)	$\approx$ 500	$p_{3+4}, p_5$	(17.9)		(1964DA07)
(19.0)	$\approx$ 400	$p_0, p_{1+2}, p_5$	(18.5)		(1964DA07) <sup>f</sup>
20.4		$p_0$	19.8	$\frac{3}{2}$	(1969KA14)
21.4	$\approx$ 400	$p_0$	20.7		(1968AP1A, 1969KA14)
22.3	$\approx$ 400	$p_0$	21.6		(1968AP1A, 1969KA14)
23.2	$\approx$ 400	$p_0, p_5$	22.4		(1968AP1A, 1969KA14)
26.7	broad	$p_0$	25.7	$\frac{5}{2}^-$	(1968AP1A, 1969KA14)
28.4		$p_0$	27.3	$\frac{5}{2}^-$	(1969KA14)

A: (1951LA15, 1951LA1B, 1953EP1A, 1954SE1A, 1954SE1B): see (1959AJ76).

<sup>a</sup> A search for fine structure near this resonance was unsuccessful: (1968SE1D).

<sup>b</sup> This may correspond to more than one state: see (1964DA02).

<sup>c</sup>  $\Gamma_{p_0} = 40_{-20}^{+10}$  eV (1967PA17).

<sup>d</sup> And C.A. Barnes, private communication.

<sup>e</sup> And P.D. Parker, private communication.

<sup>f</sup> Structures in the yields of  $p_0, p_{1+2}, p_{3+4}, p_5$  for  $19 < E_p < 28$  MeV are also reported by (1970GU04).