

Table 13.18 from (1991AJ01): ^{13}N levels from $^{12}\text{C}(p, p)$, $^{12}\text{C}(p, p')$, $^{12}\text{C}(p, \alpha)$ ^a

E_p (MeV \pm keV)	$^{13}\text{N}^*$ (MeV)	$\Gamma_{\text{c.m.}}$ (keV)	l_p	J^π	
					b
0.461 \pm 3	2.369 ^c	31 ^c	0	$\frac{1}{2}^+$	$\theta^2 = 0.54$
1.686 \pm 6	3.499 ^c	60 ^c	1	$\frac{3}{2}^-$	0.031
1.734 \pm 6	3.543 ^c	50 ^c	2	$\frac{5}{2}^+$	0.21
4.808 \pm 10	6.378	11	2	$\frac{5}{2}^+$	0.0031
5.370 \pm 10	6.896	115 \pm 5	2	$\frac{3}{2}^+$	0.13
5.65 \pm 10	7.155	9 \pm 0.5	4	$\frac{7}{2}^+$	0.016
5.891	7.38	75 \pm 5	3	$\frac{5}{2}^-$	0.069
6.5	7.9	\approx 1500	2	$\frac{3}{2}^+$	0.14
7.54	8.90	230	1	$\frac{1}{2}^-$	0.02
8.18	9.49	30	1	$\frac{3}{2}^-$	0.001
9.13	10.36	30	3	$\frac{5}{2}^-$	
9.13	10.36	76	3	$\frac{7}{2}^-$	
					$\Gamma_p/\Gamma =$
10.35 \pm 50	11.49	430 \pm 35	2	$\frac{5}{2}^+$	0.70 \pm 0.05
10.58 \pm 30	11.70	115 \pm 30	3	$\frac{5}{2}^-$	0.60 \pm 0.04
10.62 \pm 40	11.74	250 \pm 30	2	$\frac{3}{2}^+$	0.30 \pm 0.05
10.62 \pm 50	11.74	530 \pm 80	1	$\frac{3}{2}^-$	0.55 \pm 0.05
10.75 \pm 40	11.86	380 \pm 50	0	$\frac{1}{2}^+$	0.35 \pm 0.05
11.05 \pm 50	12.13	250 \pm 30	3	$\frac{7}{2}^-$	0.30 \pm 0.05
12.5	13.5	\approx 500			
13.13 \pm 20	14.05	180 \pm 35	2	$\frac{3}{2}^+; T = \frac{1}{2}$	0.29 \pm 0.07
14.23075 \pm 0.2	15.06457 \pm 0.4	0.932 \pm 0.028 ^d	1	$\frac{3}{2}^-; T = \frac{3}{2}$	
15.24 \pm 40 ^e	15.99	135 \pm 90	4	$\frac{7}{2}^+; T = \frac{1}{2}$	0.05 \pm 0.04
15.2	16.0	\approx 500			
16.8 ^e	17.4				
17.58 \pm 30	18.15	322 \pm 75	2	$\frac{3}{2}^+; T = \frac{1}{2}$	0.08 \pm 0.02
17.60 \pm 20	18.17	225 \pm 50	1	$\frac{1}{2}^-; T = \frac{1}{2}$	0.24 \pm 0.06
17.857 \pm 5 ^f	18.406	66 \pm 8	2	$\frac{3}{2}^+; T = \frac{3}{2}$	
18.460 \pm 10 ^f	18.961	23 \pm 5		$\frac{3}{2}^-$ or $\frac{7}{2}^+; T = \frac{3}{2}$	
19.40 ^g	19.83	1000	3	$\frac{5}{2}^-; T = \frac{1}{2}$	

Table 13.18 from (1991AJ01): ^{13}N levels from $^{12}\text{C}(p, p)$, $^{12}\text{C}(p, p')$, $^{12}\text{C}(p, \alpha)$ ^a (continued)

E_p (MeV \pm keV)	$^{13}\text{N}^*$ (MeV)	$\Gamma_{\text{c.m.}}$ (keV)	l_p	J^π
19.46	19.88	750	4	$\frac{7}{2}^+$; $T = \frac{1}{2}$
19.8 ^f	20.2	1000		$\frac{5}{2}^-$
20.6 \pm 300 ^{e, f}	20.9	1200		$\frac{1}{2}^+$
21.1	21.4	750		$\frac{5}{2}^-$
21.4	21.7			$\frac{3}{2}^+$
22.2 \pm 500 h	22.4	\approx 1000		$\frac{1}{2}^+$
24.0	24.1	\leq 500		
25.7	25.6			$(\frac{3}{2}^-)$
27.02	26.84			
32 ^g	31			

^a For references see [Tables 13.22 in \(1981AJ01\)](#) and [13.27 in \(1976AJ04\)](#).

^b A dispersion analysis leads to a spectroscopic factor of 0.53 ± 0.08 for $^{13}\text{N}_{\text{g.s.}}$.

^c The older values for $^{13}\text{N}^*(3.50, 3.54)$ have been reanalyzed by ([1980BA54](#)). An R -matrix analysis had led to $E_x = 2.367, 3.501$ and 3.547 MeV, and $\Gamma_{\text{c.m.}} = 33, 55$ and 50 keV for these states. $^{13}\text{N}_{\text{g.s.}}$ appears to have an appreciable effect on the low-energy scattering: see ([1981AJ01](#)). See also ([1986ADZY](#)).

^d $\Gamma_p = 263 \pm 15$ eV ([1980TH05](#)). See discussion in ([1981BR24](#)): if the ^{12}C nucleus were part of an atom the width of the resonance would be smeared out by an amount of the order of ≈ 0.5 keV (A.M. Lane, private communication). See also [Table 13.6](#).

^e Resonance in yield of 12.7 MeV γ -rays.

^f Resonance in yield of 15.1 MeV γ -rays.

^g Resonance in yield of 4.4 MeV γ -rays.

^h A $\frac{3}{2}^+$ state is indicated in this region.