

Table 12.9 from (1985AJ01):  $^{12}\text{C}$  states from  $^{10}\text{B}(^3\text{He}, \text{p})^{12}\text{C}$

$E_x$ (MeV $\pm$ keV)	$\Gamma_{\text{c.m.}}$ (keV)	Alpha decay to		Parity	$J^\pi; T$
		$^8\text{Be}_{\text{g.s.}}$	$^8\text{Be}^*(2.9)$		
4.44					
7.65		yes		natural	$0^+$
9.64	$36 \pm 6$	yes	yes	natural	
$10.849 \pm 25$	$320 \pm 30$	strong	yes	natural	
$11.841 \pm 25$	$245 \pm 30$	no	yes	unnatural	
$12.713 \pm 6$ <sup>b,c</sup>	$\approx 350$ <sup>a</sup>	no	yes <sup>c</sup>	unnatural	$1^+$
$13.29 \pm 30$		no	yes	unnatural	$\geq 1$
$14.083 \pm 15$ <sup>c</sup>	$252 \pm 15$	yes	yes <sup>c</sup>	natural	$\geq 2$
$15.108 \pm 6$ <sup>b,c</sup>					$1^+; 1$
$16.108 \pm 6$ <sup>b,c</sup>		weak	yes <sup>c</sup>	natural	$2^+$
16.58		yes	yes	natural	
$\approx 18.5$ <sup>c,d</sup>	broad	(yes)			
$\approx 19.5$ <sup>c</sup>	broad		(yes)		
$20.5 \pm 100$ <sup>a,c,e</sup>			yes		
22 <sup>c,f</sup>		(yes)			

<sup>a</sup> For references and additional information see [Table 12.10 in \(1980AJ01\)](#).

<sup>b</sup>  $\Gamma_\gamma/\Gamma = 0.025 \pm 0.01, >0.95$  and  $(2.6 \pm 0.5) \times 10^{-3}$  for  $^{12}\text{C}^*(12.7, 15.1, 16.1)$  respectively. See [Table 12.7](#) for branching ratios.

<sup>c</sup> (1982KA1M):  $E(^3\text{He}) = 19$  MeV.

<sup>d</sup> (1982KA1M) report the  $p_0$  decay of  $^{12}\text{C}^*(18.3, 20.6)$  and the  $p_2$  [to  $^{11}\text{B}^*(4.45)$ ] decay of  $^{12}\text{C}^*(20.6, 22)$ . See also [reactions 27](#) and [76](#).

<sup>e</sup> A ( $^3\text{He}, \text{pn}$ ) study suggests  $J^\pi = 3^+, T = 1$  for this state (1970BO39).

<sup>f</sup> The  $\alpha_0$  decay of states with  $20 < E_x < 25$  MeV is very unlikely, consistent with the population of  $T = 1$  states: see [reaction 21 in \(1980AJ01\)](#).