

Table 16.9 from (1982AJ01): Levels of  $^{15}\text{N}(\text{d}, \text{p})^{16}\text{N}$  and  $^{18}\text{O}(\text{d}, \alpha)^{16}\text{N}$

(1966HE10) <sup>a</sup> $E_x$ (MeV $\pm$ keV)	$l_n$ <sup>a,b</sup>	(1966HE10) <sup>c</sup>	(1970BO08) <sup>c</sup>	$J\pi$ <sup>d</sup>
0	k	0		$2^{-1}$
$0.1201 \pm 0.5$ <sup>e</sup>	k	$0.119 \pm 15$		$0^{-}$
$0.2962 \pm 1.0$ <sup>e</sup>	k	$0.301 \pm 15$		$3^{-1}$
$0.3973 \pm 1.0$ <sup>e</sup>	k	$0.400 \pm 15$		$1^{-}$
$3.365 \pm 10$		$3.358 \pm 15$		$1^{+1}$
$3.523 \pm 10$	2 or 1 + 3	$3.524 \pm 15$	f	$2^{+m}$
$3.964 \pm 10$	3	$3.964 \pm 15$		$3^{+1,m}$
$4.325 \pm 10$	1	$4.324 \pm 15$		$1^{+1}$
$4.40$ <sup>b</sup>	0	$4.383 \pm 15$		$(0, 1)^{-}$
$4.715 \pm 10$	1			$(1, 2, 3)^{+}$
$4.780 \pm 10$		$4.787 \pm 15$	f	
$(4.90 \pm 10)$				
$5.032 \pm 10$	2	$5.065 \pm 15$		$2^{-m}$
$5.128 \pm 10$	$\geq 2$			$\geq 2$
		$5.139 \pm 15$		
$5.150 \pm 10$	2			$(2, 3)^{-}$
$5.231 \pm 10$	3	$5.240 \pm 15$		$3^{+m}$
$5.310 \pm 10$				
$5.523 \pm 10$	3	$5.528 \pm 15$	f	$3^{+m}$
$5.739 \pm 10$	2	$5.740 \pm 15$	f	$(1, 2)^{-n}$
			$6.01 \pm 15$ <sup>j</sup>	
$6.170 \pm 10$	$\geq 3$	$6.168 \pm 15$	g	$4^{-1}$
$(6.28 \pm 10)$	1			$(0, 1, 2)^{+}$
$6.376 \pm 10$	2		$6.37 \pm 15$ <sup>j</sup>	$(1, 2, 3)^{-}$
$6.431 \pm 10$				
$6.514 \pm 10$	1	$6.512 \pm 15$	g	$(0, 1, 2)^{+}$
$6.609 \pm 10$		$6.620 \pm 15$	g	
$(6.79 \pm 10)$				
$6.847 \pm 10$		$6.852 \pm 15$	g	
$7.034 \pm 10$			$7.01 \pm 15$ <sup>j</sup>	

Table 16.9 from (1982AJ01): Levels of  $^{15}\text{N}(\text{d}, \text{p})^{16}\text{N}$  and  $^{18}\text{O}(\text{d}, \alpha)^{16}\text{N}$  (continued)

(1966HE10) <sup>a</sup> $E_x$ (MeV $\pm$ keV)	$l_n$ <sup>a,b</sup>	(1966HE10) <sup>c</sup>	(1970BO08) <sup>c</sup>	$J^\pi$ <sup>d</sup>
7.135 $\pm$ 10		7.141 $\pm$ 15	g	
7.250 $\pm$ 10		7.247 $\pm$ 15	g	
7.577 $\pm$ 10		7.596 $\pm$ 15	g	
7.638 $\pm$ 10			7.64 $\pm$ 15 <sup>j</sup>	
7.676 $\pm$ 10		7.683 $\pm$ 15		
7.840 $\pm$ 10			7.88 $\pm$ 15 <sup>j</sup>	
			8.06 $\pm$ 15 <sup>j</sup>	
			8.18 $\pm$ 15 <sup>j</sup>	
		8.286 $\pm$ 15	g	
		8.374 $\pm$ 15	g	
			8.49 $\pm$ 30 <sup>h</sup>	
			8.819 $\pm$ 15 <sup>i</sup>	
			9.035 $\pm$ 15	
			(9.16 $\pm$ 30)	
			(9.34 $\pm$ 30)	
			9.459 $\pm$ 15	
			(9.66 $\pm$ 40)	
			9.794 $\pm$ 15 <sup>i</sup>	
			9.90 $\pm$ 30	
			10.055 $\pm$ 15 <sup>i</sup>	
			(10.17 $\pm$ 30)	
			(10.26 $\pm$ 30)	

- a  $^{15}\text{N}(\text{d}, \text{p})^{16}\text{N}$ .
- b (1971FU14, 1972FU16;  $E_{\text{d}} = 12$  MeV). I am very much indebted to H. Fuchs for his comments.
- c  $^{18}\text{O}(\text{d}, \alpha)^{16}\text{N}$ .
- d  $J^{\pi}$  assignment from angular distribution analyses and  $\gamma$ -decay; see (1977AJ02) for references.
- e From  $\gamma$ -decay studies (1963GI11).
- f Angular distribution reported in  $^{18}\text{O}(\text{d}, \alpha)^{16}\text{N}$  at  $E_{\text{d}} = 10.0 \rightarrow 11.2$  MeV but  $L$  not determined (1970BO08).
- g Alpha group seen but  $E_{\text{x}}$  not determined.
- h  $\Gamma$  for this level and the ones listed below  $\leq 40 - 50$  keV (1970BO08).
- i These levels appear to be correlated with thresholds for neutron emission to excited states of  $^{15}\text{N}$  (1970BO08, 1970BO09).
- j T.I. Bonner, private communication.
- k Absolute spectroscopic factors for  $^{16}\text{N}^*(0, 0.12, 0.30, 0.40)$  are 0.55, 0.46, 0.54, 0.52 (1972BO49: average values in the range  $E_{\text{d}} = 5$  to 6 MeV).
- l Polarization measurements at  $E_{\text{d}} = 52$  MeV are consistent with  $J^{\pi} = 2^{-}, 3^{-}, 3^{+}$  and  $4^{-}$  for  $^{16}\text{N}^*(0, 0.30, 3.96, 6.17)$  and with  $1^{+}$  for  $^{16}\text{N}^*(3.36, 4.32)$  [admixture of  $L = 0 + 2$ ] (1981MA1W).
- m Polarization measurements at  $E_{\text{d}} = 8.5$  to 11.3 MeV are in agreement with the previously assigned  $J^{\pi}$  values for  $^{16}\text{N}^*(0, 0.12, 0.30, 0.40, 3.36, 4.32, 5.05)$  and lead to the unique  $J^{\pi}$  values for  $^{16}\text{N}^*(3.52, 3.96, 5.05, 5.23, 5.52)$  shown here (1978BA43).
- n A closely spaced doublet appears to be present. At least one of the states has unnatural parity (1978BA43).