

Table 18.10 from (1972AJ02): Energy levels of  $^{18}\text{F}$  <sup>a</sup>

$E_x$ (MeV $\pm$ keV)	$J^\pi; T$	$K^\pi$	$\tau$ or $\Gamma_{\text{c.m.}}$ (keV)	Decay	Reactions
0	$1^+; 0$	$0^+$	$\tau_{1/2} = 109.77 \pm 0.05$ min	$\beta^+$	1, 2, 3, 4, 5, 9, 10, 11, 12, 17, 18, 19, 20, 21, 22, 23, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42
$0.9370 \pm 0.2$	$3^+; 0$	$0^+$	$\tau_m = 68 \pm 7$ psec	$\gamma$	5, 9, 10, 17, 18, 19, 23, 27, 28, 30, 31, 35, 36, 37, 42
$1.0419 \pm 0.8$	$0^+; 1$		$4_{-2}^{+3}$ fsec	$\gamma$	5, 9, 18, 28, 30, 31, 32, 35, 37, 41
$1.0809 \pm 0.8$	$0^-; 0$		$30 \pm 3$ psec	$\gamma$	5, 9, 10, 17, 18, 30, 31, 35, 36, 37
$1.1218 \pm 0.7$	$5^+; 0$	$0^+$	$218 \pm 9$ nsec	$\gamma$	5, 9, 10, 17, 18, 19, 23, 28, 30, 31, 35, 37, 42
$1.7007 \pm 0.8$	$1^+; 0$	$1^+$	$0.86 \pm 0.20$ psec	$\gamma$	5, 9, 10, 17, 18, 19, 23, 30, 31, 32, 35, 37, 41, 42
$2.1013 \pm 0.5$	$2^-; 0$		$4.3 \pm 1.4$ psec	$\gamma$	9, 10, 17, 18, 19, 23, 31, 35, 37, 42
$2.5240 \pm 0.8$	$2^+; 0$	$1^+$	$0.65 \pm 0.13$ psec	$\gamma$	5, 10, 17, 18, 19, 23, 27, 28, 35, 37, 42
$3.0598 \pm 2.6$	$2^+; 1$		$\leq 1.2$ fsec	$\gamma$	5, 18, 20, 23, 27, 28, 31, 35, 37, 41, 42
$3.1349 \pm 1.6$	$1^-; 0$		$0.37_{-0.10}^{+0.15}$ psec	$\gamma$	5, 10, 18, 19, 23, 31, 35, 37, 42
$3.3569 \pm 2.6$	$3^+; 0$	$1^+$	$0.48 \pm 0.09$ psec	$\gamma$	5, 10, 18, 19, 23, 27, 31, 35, 37, 42
$3.7242 \pm 2.7$	$1^+; 0$		$< 0.08$ psec	$\gamma$	10, 18, 23, 31, 37, 42
$3.787 \pm 7$	$(3^-); 0$			$\gamma$	10, 18, 23, 31, 35, 37
$3.836 \pm 3$	$2^+; 0$		$< 0.073$ psec	$\gamma$	10, 18, 19, 23, 27, 28, 31, 35, 37, 42
$4.119 \pm 4$	$3^+; 0$			$\gamma$	10, 18, 19, 23, 28, 31, 35, 37, 42
$4.229 \pm 4$	(2)			$\gamma$	10, 18, 23, 31, 35, 37, 42
$4.361 \pm 3$	2, 3		$< 0.61$ psec	$\gamma$	10, 18, 20, 31, 35, 37, 42
$4.402 \pm 5$	$\geq 2; 0$			$\gamma$	10, 18, 19, 31, 35, 37, 42
$4.6503 \pm 1.0$	$4^+; 1$			$\gamma$	5, 10, 18, 23, 28, 31, 35, 37
$4.739 \pm 4$	$0^+; 1$			$\gamma$	18, 31, 37
$4.849 \pm 4$	1; 0			$\gamma$	5, 10, 18, 19, 37, 42
$4.957 \pm 5$	$2^+; 1$			$\gamma$	18, 23, 27, 28, 37
$5.301 \pm 4$	$4^+; 0$	$1^+$	$31 \pm 6$ fsec	$\gamma, \alpha$	5, 10, 18, 19, 23, 37, 42
$5.501 \pm 5$				$\gamma, \alpha$	5, 10, 37, 42
$5.599 \pm 11$	$(4^+; 0)$				18, 19, 35, 37
$5.606 \pm 2$	$1^-; 0, 1$		$\Gamma < 1.2$ keV	$\gamma, \alpha$	5, 8, 10, 27, 35, 37, 42
$5.674 \pm 2$	$1^-; 0, 1$		$< 0.8$	$\gamma, \alpha$	5, 8, 10, 27, 37

Table 18.10 from (1972AJ02): Energy levels of  $^{18}\text{F}$  <sup>a</sup> (continued)

$E_x$ (MeV $\pm$ keV)	$J^\pi; T$	$K^\pi$	$\tau$ or $\Gamma_{\text{c.m.}}$ (keV)	Decay	Reactions
5.785 $\pm$ 10	( $T = 0$ )				19, 37, 42
6.095 $\pm$ 2	4 <sup>-</sup> ; 0		< 2.0	$\gamma, p, \alpha$	8, 10, 18, 19, 23, 26, 37, 42
6.135 $\pm$ 2	0 <sup>+</sup> ; 1			$\gamma$	23, 37, 42
6.161 $\pm$ 2	3 <sup>+</sup> ; 1		15	$\gamma$	23, 25
6.240 $\pm$ 2	(3 <sup>-</sup> ) <sup>b</sup>		< 0.8	$\gamma, p, \alpha$	5, 8, 23, 25, 26, 37, 41, 42
6.261 $\pm$ 3	(1)		< 3	$\alpha$	8, 10, 18, 37, 41, 42
6.280 $\pm$ 2	2 <sup>+</sup> ; 1		7.5	$\gamma, p$	23, 25
6.309 $\pm$ 2	2 <sup>+</sup> , 3 <sup>+</sup>		3.1 $\pm$ 1.4	$\gamma, p, \alpha$	23, 25, 26
6.385 $\pm$ 3	(1 <sup>+</sup> ), 2, 3 <sup>-</sup>		< 4.5	$\gamma, p, \alpha$	23, 26, 37
6.483 $\pm$ 3	(1 <sup>+</sup> ), 2, 3 <sup>-</sup>		< 1.2	$\gamma, p, \alpha$	23, 26, 37
6.565 $\pm$ 4	5 <sup>+</sup> ; 0	1 <sup>+</sup>	(< 0.8)	$\gamma, \alpha$	5, 8, 10, 19, 23, 37, 42
6.646 $\pm$ 4	1 <sup>-</sup>		89 $\pm$ 4	$p, \alpha$	8, 10, 26, 37, 42
6.6474 $\pm$ 2.5	(2 <sup>-</sup> ) <sup>b</sup>		< 1.6	$\gamma, p, \alpha$	5, 7, 10, 23, 25, 26, 37, 42
6.780 $\pm$ 2	4 <sup>+</sup> , 5 <sup>+</sup> ; 0		10 $\pm$ 3	$\gamma, p, \alpha$	23, 25, 26, 37, 42
6.808 $\pm$ 3	2 <sup>+</sup> , 3 <sup>+</sup>		5 $\pm$ 3	$\gamma, p, \alpha$	10, 19, 23, 25, 26, 37, 42
6.808 $\pm$ 5	2 <sup>-</sup> ; 0		90 $\pm$ 10	$p, \alpha$	7, 8, 18, 26
6.871 $\pm$ 2				$\gamma, p, \alpha$	23, 26, 37, 42
7.194 $\pm$ 3	(4 <sup>+</sup> ); 0		< 4	$\alpha$	8, 10, 19, 37
7.206 $\pm$ 9	(1 <sup>+</sup> )		45 $\pm$ 10	(p), $\alpha$	8, 10, 18, 26
7.313 $\pm$ 10	(3 <sup>-</sup> )		53 $\pm$ 6	$p, \alpha$	7, 8, 10, 37
7.395 $\pm$ 10	(3 <sup>-</sup> ; 0)		35	$p, \alpha$	7, 8, 19, 26, 37
7.57			60	$p, \alpha$	7, 8, 26
7.653 $\pm$ 9	$T = 0$		40	$p, \alpha$	7, 8, 18, 19, 26
7.74			120	$p, \alpha$	7, 8, 26
7.872 $\pm$ 10	(2 <sup>-</sup> ); 0		30	$p, \alpha$	7, 8, 18, 19, 26
7.95	(1 <sup>+</sup> )		70	$p, \alpha$	7, 8, 26
(8.21)			$\approx$ 15	$p, \alpha$	26
(8.23)			$\approx$ 10	$p, \alpha$	26
(8.37)			$\approx$ 50	$p, \alpha$	26
8.46				$p, d, \alpha$	8, 14, 15, 16
8.596 $\pm$ 19	$T = 0$				19
8.861 $\pm$ 190	$T = 0$				19
9.145 $\pm$ 32	3, 4 <sup>-</sup> ; 0		108 $\pm$ 12	$p, d, \alpha$	14, 15, 16, 18
9.26	3 <sup>-</sup> <sup>b</sup>		$\approx$ 30	$d, \alpha$	16
9.32	2 <sup>+</sup> <sup>b</sup>		$\approx$ 40	(p), $d, \alpha$	14, 16, 18
9.494 $\pm$ 15	(6 <sup>-</sup> ); 0				19
9.50	2, 3 <sup>+</sup> ; 0			$n, d, \alpha$	13, 16, 18
(9.55)	2, 3 <sup>+</sup> ; 0			$d, \alpha$	16

Table 18.10 from (1972AJ02): Energy levels of  $^{18}\text{F}$  <sup>a</sup> (continued)

$E_x$ (MeV $\pm$ keV)	$J^\pi; T$	$K^\pi$	$\tau$ or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
(9.70)	$3^- b$		370	n, d, $\alpha$	13, 16
9.82 $\pm$ 40	$2^+ b$		200	d, $\alpha$	16, 18, 19
10.06 $\pm$ 45				n, p, d	13, 14, 18, 19
(10.21)	$1^- b$		90	d, $\alpha$	16
(10.24)	$3, 4^-$			d, $\alpha$	16
10.268 $\pm$ 12	$3^- b$		180	n, p, d, $\alpha$	13, 14, 16, 19
(10.31)	$2^+ b$		570	d, $\alpha$	16
10.352 $\pm$ 25	$1^- b$		270	(n), d, $\alpha$	13, 16, 18
10.42	$3^- b$		50	(n), d, $\alpha$	13, 16
10.541 $\pm$ 10	$2^+ b$		50	n, p, d, $\alpha$	13, 14, 16, 19
10.59	$1^- b$		160	d, $\alpha$	16
(10.61)	$4, 5^+; 0$			d, $\alpha$	16
10.61	$2^+ b$		150	d, $\alpha$	16
(10.63)	$1^- b$		60	d, $\alpha$	16
10.64	$3^- b$		240	d, $\alpha$	16
(10.68)	$2^+ b$		60	d, $\alpha$	16
10.69	$3^- b$		75	d, $\alpha$	16
(10.71)	$2^+ b$		375	d, $\alpha$	16
10.73 $\pm$ 30	$(2^-); 0$			(n, p), $\alpha$	6, 7
10.80	$2^+ b$		85	n, p, d, $\alpha$	13, 14, 16
(10.90)	$(2, 3)^+; 0$			p, d, $\alpha$	14, 16
10.91	$1^- b$		240	d, $\alpha$	16
(10.95 )	$2^+ b$		400	d, $\alpha$	16, 18
10.98	$3^- b$		120	d, $\alpha$	16, 18
(10.99)	$2^+ b$		220	d, $\alpha$	16
(11.03)	$2^+ b$		80	d, $\alpha$	16
(11.03)	$3, 4^-; 0$		$\approx 35$	p, d, $\alpha$	14, 16
11.073 $\pm$ 37	$2^+$		50	d, $\alpha$	16, 19
(11.11)	$1^- b$		1000	d, $\alpha$	16
11.13 $\pm$ 50	$3^- b$		35	n, p, d, $\alpha$	13, 14, 16, 18
11.26	$3^- b$		240	d, $\alpha$	16
(11.30)	$2^+ b$		475	d, $\alpha$	16
11.31	$4^+ b$		40	d, $\alpha$	16
(11.32)	$2^+ b$		95	d, $\alpha$	16
11.32	$3^- b$		65	d, $\alpha$	16
11.384 $\pm$ 18	$4, 5^+; 0$			p, d, $\alpha$	14, 16, 19
(11.51)	$2^+ b$		125	d, $\alpha$	16
11.56	$3^- b$		70	d, $\alpha$	16

Table 18.10 from (1972AJ02): Energy levels of  $^{18}\text{F}$  <sup>a</sup> (continued)

$E_x$ (MeV $\pm$ keV)	$J^\pi; T$	$K^\pi$	$\tau$ or $\Gamma_{\text{c.m.}}$ (keV)	Decay	Reactions
(11.59)	5, 6 <sup>-</sup> ; 0			d, $\alpha$	16
(11.66)	2 <sup>+</sup> b		240	d, $\alpha$	16
(11.79)	$\geq 3$ ; 0			(n, p), d, $\alpha$	6, 7, 15, 16
11.83	1 <sup>-</sup> b		180	(n, p), d, $\alpha$	6, 7, 16
(11.91)	5, 6 <sup>-</sup> ; 0			d, $\alpha$	16
11.96	3 <sup>-</sup> b		30	d, $\alpha$	16
(11.97)	2 <sup>+</sup> b		125	d, $\alpha$	16
12.01			40	d, $\alpha$	16
12.055 $\pm$ 16	$T = 0$		60	d, $\alpha$	16, 19
12.12	$T = 0$		55	d, $\alpha$	16
12.12	3 <sup>-</sup> b		35	d, $\alpha$	16
(12.14)	2 <sup>+</sup> b		220	d, $\alpha$	16
12.25			70	d, $\alpha$	16
12.25 $\pm$ 30	(2 <sup>-</sup> , 3); 0		170	(n, p), d, $\alpha$	6, 7, 16
12.32			130	d, $\alpha$	16
(12.31)	1 <sup>-</sup> b		100	d, $\alpha$	16
12.34	3 <sup>-</sup> b		190	d, $\alpha$	16
12.36	2 <sup>+</sup> b		80	d, $\alpha$	16
12.38	2 <sup>+</sup> b		120	d, $\alpha$	16
(12.47)	1 <sup>-</sup> b		35	d, $\alpha$	16
(12.48)	(3 <sup>-</sup> )		120	d, $\alpha$	16
12.484 $\pm$ 15	4 <sup>+</sup> b		60	d, $\alpha$	8, 16
12.526 $\pm$ 15	3 <sup>-</sup> b		80	d, $\alpha$	8, 16
12.565 $\pm$ 15	2 <sup>+</sup> b		$\approx 300$	(n, p), d, $\alpha$	6, 7, 8, 16
(12.63)	2 <sup>+</sup>		210	d, $\alpha$	16
(12.67)	2 <sup>+</sup> b		290	d, $\alpha$	16
12.68			160	d, $\alpha$	16
12.683 $\pm$ 15	5 <sup>-</sup> b		45	n, p, d, $\alpha$	6, 7, 8, 16, 19
12.702 $\pm$ 15	3 <sup>-</sup> b		70	d, $\alpha$	8, 16
(12.78)			160	d, $\alpha$	16
(12.81)	2 <sup>+</sup> b		440	d, $\alpha$	16
(12.86)			120	d, $\alpha$	16
(12.90)	3 <sup>-</sup> b		120	d, $\alpha$	16
(12.96)			120	d, $\alpha$	16
(12.99)	2 <sup>+</sup> b		650	d, $\alpha$	16
(13.03)	3 <sup>-</sup> b		250	d, $\alpha$	16
13.06 $\pm$ 15	4 <sup>+</sup>		40	d, $\alpha$	8, 16
(13.08)	$T = 0$		150	d, $\alpha$	16

Table 18.10 from (1972AJ02): Energy levels of  $^{18}\text{F}$  <sup>a</sup> (continued)

$E_x$ (MeV $\pm$ keV)	$J^\pi; T$	$K^\pi$	$\tau$ or $\Gamma_{\text{c.m.}}$ (keV)	Decay	Reactions
(13.12)			160	d, $\alpha$	16
13.129 $\pm$ 15	(4 <sup>+</sup> )		35	d, $\alpha$	8, 16
(13.16)			160	d, $\alpha$	16
(13.17)	1 <sup>-</sup> <sup>b</sup>		185	d, $\alpha$	16
13.198 $\pm$ 15	5 <sup>-</sup> <sup>b</sup>		140	d, $\alpha$	8, 16
(13.20)	$T = 0$		145	d, $\alpha$	16
(13.20)	4 <sup>+</sup> <sup>b</sup>		255	d, $\alpha$	16
(13.24)			120	d, $\alpha$	15, 16
(13.26)			100	d, $\alpha$	16
(13.26)	4 <sup>+</sup> <sup>b</sup>		360	d, $\alpha$	16
(13.29)	2 <sup>+</sup> <sup>b</sup>		100	d, $\alpha$	16
13.332 $\pm$ 15	5 <sup>-</sup> <sup>b</sup>		50	d, $\alpha$	8, 16
(13.34)			135	d, $\alpha$	16
(13.40)			120	d, $\alpha$	16
13.398 $\pm$ 15	6 <sup>+</sup>		85	$\alpha$	8
(13.43)			200	d, $\alpha$	16
(13.43)	3 <sup>-</sup> <sup>b</sup>		235	d, $\alpha$	16
(13.44)	1 <sup>-</sup> <sup>b</sup>		100	d, $\alpha$	16
13.464 $\pm$ 15	4 <sup>+</sup>		100	d, $\alpha$	8, 16
13.50	5 <sup>-</sup> <sup>b</sup>		65	d, $\alpha$	16
(13.50)	2 <sup>+</sup> <sup>b</sup>		145	d, $\alpha$	16
(13.57)			140	d, $\alpha$	16
13.597 $\pm$ 15	6 <sup>+</sup>		100	$\alpha$	8
(13.60)			150	d, $\alpha$	16
(13.60)	4 <sup>+</sup> <sup>b</sup>		40	d, $\alpha$	16
(13.61)	1 <sup>-</sup> <sup>b</sup>		90	d, $\alpha$	16
13.65	5 <sup>-</sup> <sup>b</sup>		300	d, $\alpha$	16
13.652 $\pm$ 15	3 <sup>-</sup>		60	$\alpha$	8
13.671 $\pm$ 15	(2 <sup>+</sup> )		60	$\alpha$	8
13.679 $\pm$ 15	4 <sup>+</sup> <sup>b</sup>		70	d, $\alpha$	8, 16
(13.70)	2 <sup>+</sup> <sup>b</sup>		80	d, $\alpha$	16
(13.77)	3 <sup>-</sup> <sup>b</sup>		205	d, $\alpha$	16
13.780 $\pm$ 15	4 <sup>+</sup> <sup>b</sup>		130	d, $\alpha$	8, 16
(13.81)	2 <sup>+</sup> <sup>b</sup>		265	d, $\alpha$	16
(13.85)			60	d, $\alpha$	16
(13.92)			210	d, $\alpha$	16
13.917 $\pm$ 15	(4 <sup>+</sup> , 2 <sup>+</sup> )			$\alpha$	8
(13.96)	1 <sup>-</sup> <sup>b</sup>		70	d, $\alpha$	16

Table 18.10 from (1972AJ02): Energy levels of  $^{18}\text{F}$  <sup>a</sup> (continued)

$E_x$ (MeV $\pm$ keV)	$J^\pi; T$	$K^\pi$	$\tau$ or $\Gamma_{\text{c.m.}}$ (keV)	Decay	Reactions
(13.99)			150	d, $\alpha$	<a href="#">16</a>
13.980 $\pm$ 15	5 <sup>-</sup> <sup>b</sup>		170	d, $\alpha$	<a href="#">8, 16</a>
(14.01)			110	d, $\alpha$	<a href="#">16</a>
(14.05)			200	d, $\alpha$	<a href="#">16</a>
(14.08)			210	d, $\alpha$	<a href="#">16</a>
(14.10)	2 <sup>+</sup> <sup>b</sup>		170	d, $\alpha$	<a href="#">16</a>
(14.10)	4 <sup>+</sup> <sup>b</sup>		75	d, $\alpha$	<a href="#">16</a>
14.162 $\pm$ 5	5 <sup>-</sup> <sup>b</sup>		200	d, $\alpha$	<a href="#">8, 16</a>
(14.18 )			220	d, $\alpha$	<a href="#">16</a>
(14.26)			200	d, $\alpha$	<a href="#">16</a>
(14.30)			85	d, $\alpha$	<a href="#">16</a>
(14.33)	$T = 0$		130	d, $\alpha$	<a href="#">16</a>
14.323 $\pm$ 15	4 <sup>+</sup>		95	$\alpha$	<a href="#">8</a>
(14.34)	$T = 0$		250	d, $\alpha$	<a href="#">16</a>
d					
16.513 $\pm$ 15 <sup>c</sup>	6 <sup>+</sup> (7 <sup>-</sup> )		$\approx$ 50	$\alpha$	<a href="#">8</a>
16.606 $\pm$ 15 <sup>c</sup>	5 <sup>-</sup>		$\approx$ 50	$\alpha$	<a href="#">8</a>
16.723 $\pm$ 15 <sup>c</sup>	6 <sup>+</sup>		$\approx$ 150	$\alpha$	<a href="#">8</a>
16.870 $\pm$ 15 <sup>c</sup>	7 <sup>-</sup>		$\approx$ 200	$\alpha$	<a href="#">8</a>
16.948 $\pm$ 15 <sup>c</sup>	6 <sup>+</sup>		$\approx$ 150	$\alpha$	<a href="#">8</a>

<sup>a</sup> See also Tables [18.14](#), [18.15](#) and [18.17](#).

<sup>b</sup> Isospin mixed state: see ([1970JO1C](#)) and [Table 18.20](#).

<sup>c</sup> State not reported in  $^{16}\text{O}(\text{d}, \alpha)^{14}\text{N}$ : see [Table 18.17](#).

<sup>d</sup> [92 additional states with  $14.36 < E_x < 20.80$  MeV are reported in  $^{16}\text{O}(\text{d}, \alpha)^{14}\text{N}$ : see [Table 18.17](#)].