

Table 19.6 from (1987AJ02): Energy levels of ^{19}F ^a

E_x (MeV \pm keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
0	$\frac{1}{2}^+; \frac{1}{2}$	$\frac{1}{2}^+$	stable		7, 9, 10, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 28, 29, 30, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53
0.109894 ± 0.005	$\frac{1}{2}^-$	$\frac{1}{2}^-$	$\tau_m = 0.853 \pm 0.010$ nsec	γ	7, 9, 13, 15, 16, 21, 23, 29, 30, 33, 34, 35, 37, 40, 49, 51, 53
0.197143 ± 0.004	$\frac{5}{2}^+$	$\frac{1}{2}^+$	128.8 ± 1.5 nsec $ g = 1.441 \pm 0.003$	γ	6, 7, 10, 13, 14, 15, 16, 21, 22, 23, 29, 30, 34, 35, 36, 37, 40, 42, 44, 49, 51
1.34567 ± 0.13	$\frac{5}{2}^-$	$\frac{1}{2}^-$	4.13 ± 0.06 psec $ g = 0.27 \pm 0.04$	γ	7, 9, 10, 14, 15, 16, 21, 23, 29, 30, 34, 35, 36, 37, 40
1.4587 ± 0.3	$\frac{3}{2}^-$	$\frac{1}{2}^-$	90 ± 20 fsec	γ	9, 10, 15, 16, 21, 29, 33, 34, 35, 36, 37, 40, 44, 51
1.554038 ± 0.009	$\frac{3}{2}^+$	$\frac{1}{2}^+$	5 ± 3 fsec	γ	7, 14, 15, 16, 21, 22, 23, 28, 29, 30, 34, 35, 36, 37, 40, 42, 44, 49, 51
2.779849 ± 0.034	$\frac{9}{2}^+$	$\frac{1}{2}^+$	280 ± 30 fsec	γ	2, 3, 5, 7, 10, 12, 14, 15, 16, 19, 21, 22, 28, 29, 34, 35, 36, 40, 42, 44, 50, 51
3.90817 ± 0.20	$\frac{3}{2}^+$	$\frac{3}{2}^+$	9 ± 5 fsec	γ	7, 15, 16, 21, 23, 29, 30, 33, 34, 36, 40, 51
3.9987 ± 0.7	$\frac{7}{2}^-$	$\frac{1}{2}^-$	19 ± 7 fsec	γ	7, 15, 16, 21, 28, 29, 34, 36, 40, 51
4.0325 ± 1.2	$\frac{9}{2}^-$	$\frac{1}{2}^-$	67 ± 15 fsec	γ	7, 10, 14, 15, 16, 21, 28, 34, 36, 40, 51

Table 19.6 from (1987AJ02): Energy levels of ^{19}F ^a (continued)

E_x (MeV \pm keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
4.377700 \pm 0.042	$\frac{7}{2}^+$	$\frac{3}{2}^+$	< 11 fsec	γ	7, 14, 15, 16, 21, 22, 23, 28, 29, 30, 34, 36, 40, 51
4.5499 \pm 0.8	$\frac{5}{2}^+$	$\frac{3}{2}^+$	< 50 fsec	γ	7, 15, 16, 21, 23, 34, 36, 40, 51
4.5561 \pm 0.5	$\frac{3}{2}^-$		17_{-8}^{+10} fsec	γ	7, 15, 16, 23, 28, 29, 34, 36, 40, 51
4.648 \pm 1	$\frac{13}{2}^+$	$\frac{1}{2}^+$	3.7 ± 0.4 psec	γ	14, 15, 16, 21, 22, 23, 34, 40, 51
4.6825 \pm 0.7	$\frac{5}{2}^-$		15.4 ± 3.0 fsec	γ, α	7, 15, 19, 21, 23, 28, 29, 34, 36, 40, 51
5.1066 \pm 0.9	$\frac{5}{2}^+$		< 30 fsec	γ, α	7, 15, 16, 21, 23, 28, 29, 34, 36, 40, 51
5.337 \pm 2	$\frac{1}{2}^{(+)}$		≤ 0.1 fsec	γ, α	7, 15, 16, 21, 23, 29, 34, 36, 40, 51
5.418 \pm 1	$\frac{7}{2}^-$		$\Gamma = (2.6 \pm 0.7) \times 10^{-3}$	γ, α	3, 7, 15, 21, 23, 29, 34, 36, 40
5.4635 \pm 1.5	$\frac{7}{2}^+$	$\frac{1}{2}^+$	$\tau_m \leq 0.26$ fsec	γ, α	7, 10, 14, 15, 16, 21, 22, 23, 34, 36, 40
5.5007 \pm 1.7	$\frac{3}{2}^+$		$\Gamma = 4 \pm 1$ keV	γ, α	7, 8, 16, 21, 23, 34, 36, 40
5.535 \pm 2	$\frac{5}{2}^+$			γ, α	7, 21, 23, 34, 36, 40, 51
5.621 \pm 1	$\frac{5}{2}^-$		$\tau_m < 1.3$ fsec	γ, α	7, 21, 23, 28, 29, 34, 36, 40, 50, 51
5.938 \pm 1	$\frac{1}{2}^+$			γ, α	7, 23, 28, 29, 34, 36, 51
6.070 \pm 1	$\frac{7}{2}^+$		$\Gamma = 1.2$	γ, α	7, 21, 34, 36
6.088 \pm 1	$\frac{3}{2}^-$		4	γ, α	7, 10, 15, 16, 21, 23, 34, 36, 51
6.100 \pm 2	$\frac{9}{2}^-$			γ	23, 34
6.1606 \pm 0.9	$\frac{7}{2}^-$		$(3.7 \pm 1.0) \times 10^{-3}$	γ, α	3, 7, 23, 34, 36, 51
6.255 \pm 1	$\frac{1}{2}^+$		8	α	8, 21, 23, 28, 29, 34, 36, 51
6.282 \pm 2	$\frac{5}{2}^+$		2.4	γ, α	7, 8, 14, 21, 23, 28, 34, 36
6.330 \pm 2	$\frac{7}{2}^+$		2.4	γ, α	7, 8, 10, 21, 34, 36

Table 19.6 from (1987AJ02): Energy levels of ^{19}F ^a (continued)

E_x (MeV \pm keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
6.429 \pm 8	$\frac{1}{2}^-$		280	α	8, 34
6.4967 \pm 1.4	$\frac{3}{2}^+$			γ, α	7, 16, 21, 23, 29, 34
6.5000 \pm 0.9	$\frac{11}{2}^+$	$\frac{3}{2}^+$		γ, α	7, 16, 22, 23, 34
6.5275 \pm 1.4	$\frac{3}{2}^+$		4	γ, α	7, 14, 16, 21, 23, 34
6.554 \pm 2	$\frac{7}{2}^+(+)$		1.6	γ, α	7, 21, 34
6.592 \pm 2	$\frac{9}{2}^+$	$\frac{3}{2}^+$	$(7.6 \pm 1.8) \times 10^{-3}$	γ, α	3, 7, 14, 21, 23, 29, 34
6.787 \pm 2	$\frac{3}{2}^-$		$(6.9 \pm 1.1) \times 10^{-3}$	γ, α	7, 8, 21, 23, 29, 34
6.8384 \pm 0.9	$\frac{5}{2}^+$		1.2	γ, α	7, 8, 21, 23, 34
6.891 \pm 4	$\frac{3}{2}^-$		28	γ, α	7, 8, 21, 34
6.9265 \pm 1.7	$\frac{7}{2}^-$		2.4	γ, α	7, 8, 10, 14, 15, 21, 23, 29, 34
6.989 \pm 3	$\frac{1}{2}^-$		51	α	8, 23, 34
7.114 \pm 6	$\frac{7}{2}^+$		32	α	8, 29, 34
7.1662 \pm 0.7	$\frac{11}{2}^-$		$(6.9 \pm 1.1) \times 10^{-3}$	γ, α	3, 7, 23, 34
7.262 \pm 2	$\frac{3}{2}^+$		< 6	α	8, 14, 15, 16, 23, 28, 29, 34, 42
7.364 \pm 4	$\frac{1}{2}^+$			α	16, 23, 28, 29, 34
7.5396 \pm 0.9	$\frac{5}{2}^+; \frac{3}{2}^+$		(c)	γ, α	7, 8, 10, 14, 23, 29, 34
7.56 \pm 10	$\frac{7}{2}^+$		< 90	α	8
7.587	$(\frac{5}{2}^-)$			γ	34
7.6606 \pm 0.9	$\frac{3}{2}^+; \frac{3}{2}^+$			γ, α	7, 23, 29, 33, 34, 52
7.702 \pm 5	$\frac{1}{2}^-$		< 30	α	8, 14, 23, 29, 34
7.74 \pm 40	$(\frac{5}{2}, \frac{7}{2})^-$		< 6		34, 42
(7.90)			< 200	α	8
7.929 \pm 3	$\frac{7}{2}^+; \frac{9}{2}^+$			γ, α	7, 14, 16
7.937 \pm 3	$\frac{11}{2}^+$			γ, α	7, 22
8.0140 \pm 1.0	$\frac{5}{2}^+$			p	29
8.084 \pm 3			≤ 3	p, α	8, 27, 29
8.1377 \pm 1.2	$\frac{1}{2}^+$		≤ 0.3	γ, p, α	8, 23, 27, 28, 29
(8.16)			< 50	α	8
8.1990 \pm 1.0	$(\frac{5}{2}^+)$		≤ 1	γ, p, α	8, 23, 27, 29
8.2543 \pm 2.6	$(\frac{5}{2}, \frac{7}{2})^-$		≤ 1.5	γ, p	23, 29, 42

Table 19.6 from (1987AJ02): Energy levels of ^{19}F ^a (continued)

E_x (MeV \pm keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
8.288 ± 2	$\frac{13}{2}^-$	$(\frac{1}{2}^-)$	$< 1^c$	γ, α	3, 7, 8, 9, 10, 11, 12, 14, 15
8.3100 ± 1.2	$\frac{5}{2}^+$		0.047 ± 0.019	γ, p, α	7, 23, 27, 29
8.370 ± 4	$\frac{7}{2}, \frac{5}{2}^+$		7.5 ± 1.5	γ, α	7
8.5835 ± 1.6	$\frac{5}{2}^+$		≤ 0.5	γ, p, α	7, 23
8.5919 ± 1.0	$\frac{3}{2}^-$		2.0 ± 0.1	γ, p, α	7, 14, 23, 25, 27, 29
8.629 ± 4	$\frac{7}{2}^-$		$< 1^c$	γ, α	7, 8, 42
8.65	$\frac{1}{2}^+$		≈ 300	γ, p, α	23, 25, 27
8.7932 ± 1.5	$\frac{1}{2}^+; \frac{3}{2}$		46 ± 2	γ, p	23, 25, 27, 29
8.864 ± 4	$< \frac{9}{2}$		≈ 1	γ, α	7
8.9267 ± 2.8	$\frac{3}{2}^-$		3.6 ± 0.2	γ, p, α	14, 15, 23, 25, 27
8.953 ± 3	$\frac{11}{2}^-$		$\approx 1^c$	γ, α	3, 7, 8, 9, 10, 11, 12
9.030 ± 5	$\frac{5}{2}, \frac{7}{2}$		4.2 ± 1	γ, α	7
9.0997 ± 0.7	$\frac{7}{2}^-$		0.57 ± 0.03	γ, p, α	7, 23, 25, 27
9.101 ± 4	$\frac{7}{2}^+, \frac{9}{2}^+$		≈ 1	γ, α	7, 29
9.167 ± 1.4	$\frac{1}{2}^+$		6.2 ± 0.5	γ, p, α	7, 25, 27, 29
9.204 ± 7	$\frac{3}{2}$		10.2 ± 1.5	γ, α	7
9.267 ± 4	$\frac{11}{2}^+, \frac{9}{2}^+$		2 ± 1	γ, α	7
9.280 ± 5	$(\frac{7}{2}, \frac{9}{2})^+$		< 1.5	γ, α	7, 42
9.318 ± 2	$\frac{3}{2}^+$		3.4 ± 0.7	γ, p, α	7, 14, 23
9.321 ± 1.1	$\frac{1}{2}^+$		5.0 ± 0.2	p, α	25, 27
9.329 ± 4	$< \frac{5}{2}$		≈ 6	γ, α	7
9.509 ± 4	$\frac{5}{2}^+, \frac{7}{2}^+ c$		$< 1^c$	γ, α	7, 8
9.527 ± 6	$(\frac{5}{2})$		28	p, α	25, 27
9.5364 ± 2.0	$\frac{5}{2}^+$		6.3 ± 1.5	γ, p, α	7, 23
9.566 ± 3	$\frac{3}{2}^-$		26 ± 3	γ, p	23
9.575 ± 4	$\frac{3}{2}^-$		67 ± 3	γ, p, α	23, 25, 27
9.586 ± 3	$\frac{7}{2}$		8.9 ± 1.2	γ, p, α	7, 23, 29
9.642 ± 6	$\frac{3}{2}, \frac{5}{2}$		≈ 8	γ, α	7
9.654 ± 6	$\frac{3}{2}, \frac{5}{2}$		≈ 6	γ, α	7
9.6675 ± 1.5	$\frac{3}{2}^+$		3.6 ± 0.4	γ, p, α	7, 23, 25, 27, 29
9.710 ± 4	$\frac{9}{2}^+, \frac{11}{2}^- c$		$< 1^c$	γ, α	3, 7, 8, 14
9.820 ± 1.0	$\frac{5}{2}^-$		0.3 ± 0.05	γ, p, α	7, 23, 25, 27

Table 19.6 from (1987AJ02): Energy levels of ^{19}F ^a (continued)

E_x (MeV \pm keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
9.834 \pm 3	$\frac{11}{2}^- \rightarrow \frac{15}{2}^-$		$< 1^c$	γ, α	7, 8
9.8740 \pm 1.8	$\frac{11}{2}^-$		$(2.6 \pm 0.6) \times 10^{-3}$	γ, p, α	3, 7, 8, 14, 15, 23
9.887 \pm 3	$\frac{1}{2}^+$		25 ± 2	γ, p, α	23, 25, 27
9.926 \pm 3	$\frac{9}{2}^+ c$		$\approx 1^c$	γ, α	3, 7, 8
10.088 \pm 5	$\frac{5}{2}^-, \frac{7}{2}^- c$		$< 1.5^c$	γ, α	7, 8, 10
10.137 \pm 0.8	$\frac{3}{2}^-$		4.3 ± 0.6	γ, p, α	7, 23, 27
10.162 \pm 3	$\frac{1}{2}^+$		31	p, α	25, 27
10.232 \pm 3	$\frac{1}{2}^+$		< 1	p, α	8, 25, 27
10.254 \pm 3	$\frac{1}{2}^+$		22	p, α	25, 27
10.308 \pm 4	$\frac{3}{2}^+$		9.2	p, α	8, 16, 25, 27
10.365 \pm 4	$\frac{7}{2}^- \rightarrow \frac{11}{2}^-$		3 ± 1.5	γ, α	7, 29
10.411 \pm 3	$\frac{13}{2}^+$	$\frac{3}{2}^+$	$< 1.5^c$	γ, α	3, 7, 8, 10, 14, 15, 16, 23, 50
10.469 \pm 4			11.0 ± 1.2	p, α	8
10.488 \pm 4			4.8 ± 0.8	p, α	8
10.4963 \pm 1.3	$\frac{3}{2}^+$		5.7 ± 0.6	n, p, α	8, 24, 25, 27
10.521 \pm 4			14 ± 2	p, α	8, 29
10.5423 \pm 1.1			2.5 ± 0.2	n, p, α	8, 24
10.555 \pm 3	$\frac{3}{2}^+; (\frac{3}{2})^-$		4.0 ± 1.2	p, α	8, 25, 27
10.5647 \pm 2.0			4.6 ± 0.7	n, p, α	8, 24
10.581 \pm 4	$(\frac{5}{2}^+)$		22 ± 3	p, α	25, 27
10.6143 \pm 1.6	$\frac{5}{2}^+; \frac{3}{2}^-$		4.7 ± 0.5	n, p, α	24, 25, 27
10.7633 \pm 2.5	$\frac{1}{2}^-$		6 ± 3	n, p, α	14, 24, 25, 27
10.8597 \pm 1.9	$\frac{5}{2}^+$		24.0 ± 1.5	n, p, α	24, 25, 27
10.927 \pm 8				γ	3
10.9750 \pm 2.5	$(\frac{3}{2}, \frac{5}{2})^+$		14 ± 2	n, p, α	24, 25, 27
10.989 \pm 2.5			7 ± 2	n, p	24
11.072 \pm 2.7	$\frac{1}{2}^+$		35 ± 4	n, p, α	24, 25, 27
11.188 \pm 4	$(\frac{1}{2}^-)$		17 ± 4	n, p, α	24, 25, 27
11.273 \pm 3			7 ± 2	n, p	24
11.286 \pm 7	$\frac{5}{2}^+$		22 ± 5	n, p, α	24, 25, 27
11.35 \pm 25	$\frac{1}{2}^+$		272 ± 31	p	25
11.450 \pm 3.5	$\frac{1}{2}^-$		38 ± 7	$n, p, (\alpha)$	14, 24, 25, 27

Table 19.6 from (1987AJ02): Energy levels of ^{19}F ^a (continued)

E_x (MeV \pm keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
11.478 \pm 5			7 \pm 3	n, p	24
11.502 \pm 5	$(\frac{3}{2}^-)$		4 \pm 2	n, p, α	24, 25, 27
11.540 \pm 7	$\frac{5}{2}^+$		22 \pm 5	n, p, α	24, 25, 27
11.569 \pm 7	$(T = \frac{3}{2})$		15 \pm 10	n, p	24
11.603 \pm 12	$\frac{3}{2}^-$		63 \pm 7	n, p	24, 25
11.653 \pm 4	$\frac{3}{2}^+; (\frac{3}{2})$		33 \pm 6	n, p, (α)	10, 14, 24, 25, 27
11.84 \pm 10			< 50	n, p	24
11.93 \pm 10			90	n, p	24
12.04 \pm 20	$\frac{1}{2}^-$		71 \pm 24	p, α	10, 25, 27
12.136 \pm 8	$\frac{3}{2}^-; \frac{3}{2}$		105 \pm 14	n, p, (α)	24, 25, 27
12.222 \pm 12	$\frac{3}{2}^+$		74 \pm 1	n, p, α	24, 25, 27
12.522 \pm 7	$\frac{1}{2}^-$		15 \pm 4	p	25
12.577 \pm 10	$\frac{5}{2}^+$		48 \pm 10	p, α	25, 27
12.58 \pm 25	$\frac{1}{2}^-; \frac{3}{2}$		285 \pm 48	p	25
12.78 \pm 10	$\frac{5}{2}^+; \frac{3}{2}$		95 \pm 38	n, p, (α)	14, 24, 25, 27
12.86 \pm 30	$\frac{3}{2}^+; \frac{3}{2}$		276 \pm 38	p	25
12.94 \pm 25	$\frac{5}{2}^+$		71 \pm 24	p, α	25, 27
12.98 \pm 50	$\frac{1}{2}^-$		124 \pm 38	p	25
13.068 \pm 4	$\frac{1}{2}^+$		\leq 10	n, p, t	13, 24
13.09 \pm 75	$\frac{3}{2}^-$		285 \pm 71	p	25
13.17 \pm 15			70	n, p	24
13.245 \pm 10	$\frac{1}{2}^-$		7	t	13
13.270 \pm 10	$\frac{1}{2}^+$		4.5	t	13
13.317 \pm 8	$\frac{7}{2}^-; (\frac{3}{2})$		28 \pm 6	n, p, α	24, 25, 27
13.36 \pm 25	$\frac{3}{2}^-$		38 \pm 19	p	25
13.532 \pm 10	$\frac{1}{2}^+$		22	t	13
13.732 \pm 11	$\frac{7}{2}^-; \frac{3}{2}$		52 \pm 10	n, p, (α)	15, 24, 25, 27
13.878 \pm 15	$\frac{1}{2}^+$		101	t	13
14.04 \pm 20	$\frac{5}{2}^+$		141 \pm 28	p	25
14.10 \pm 21	$\frac{3}{2}^-$		84 \pm 28	p	10, 15, 25
14.147 \pm 20	$\frac{1}{2}^+$		21	t	13
14.24 \pm 15			350	n, p	24
14.255 \pm 15	$\frac{3}{2}^+$		51	t	13

Table 19.6 from (1987AJ02): Energy levels of ^{19}F ^a (continued)

E_x (MeV \pm keV)	$J^\pi; T$	K^π	τ_m or $\Gamma_{c.m.}$ (keV)	Decay	Reactions
14.33 \pm 20	$\frac{3}{2}^-$		76 \pm 28	p	25
14.352 \pm 10	$\frac{1}{2}^+$		154	t	13
14.46 \pm 25	$\frac{3}{2}^+$		179	t	13
14.46 \pm 25	$\frac{5}{2}^+$		46	t	13
14.70 \pm 20	$\frac{3}{2}^-$		124 \pm 38	p	25
14.72 \pm 70	$\frac{1}{2}^-$		257 \pm 67	α	27
14.74 \pm 50	$\frac{1}{2}^+$		361 \pm 67	p, α	25, 27
14.78 \pm 20	$\frac{5}{2}^+$			n, p	24, 25
14.92 \pm 30	$\frac{7}{2}^-$			p	10, 15, 25
15.00 \pm 20				n, p	24
15.36 \pm 20	$\frac{1}{2}^-$			p	25
15.40 \pm 30	$\frac{5}{2}^+$			p	25
15.56 \pm 30					15
15.77 \pm 21	$\frac{3}{2}^-$		150	n, p	24
16.09 \pm 50					10
16.20 \pm 40	$\frac{3}{2}^+$			p	25
16.23 \pm 30	$\frac{7}{2}^-$			p	25
16.28 \pm 20	$\frac{3}{2}^-$		200	n, p	24, 25
16.45 \pm 50					10
16.80 \pm 30				n, p	24
17.05 \pm 40	$\frac{3}{2}^-$		331 \pm 67	p	25
17.16 \pm 40	$\frac{7}{2}^-$		323 \pm 67	p	25
17.45 \pm 30	$\frac{3}{2}^-$		32 \pm 19	p	10, 25
17.65 \pm 60	$\frac{7}{2}^-$		95 \pm 57	p	25
17.93 \pm 40	$\frac{3}{2}^-$		255 \pm 57	p	25
18.03 \pm 60	$\frac{7}{2}^-$		365 \pm 57	p	10, 25
18.92 \pm 30					10
19.07 \pm 60	$\frac{3}{2}^-$		555 \pm 143	p	25
19.83 \pm 150	$\frac{5}{2}^-$		369 \pm 57	p	25
19.89 \pm 30	$\frac{3}{2}^-$		473 \pm 57	p	10, 25
20.81 \pm 50	$\frac{1}{2}^-$		412 \pm 57	p	25
20.93 \pm 50	$\frac{3}{2}^-$		317 \pm 48	p	25
21.05 \pm 40 ^b	$\frac{7}{2}^-$		448 \pm 29	p	25

^a See also [Tables 19.7](#) and [19.8](#).

^b For evidence of additional states see [reaction 32](#).

^c See [Table 19.11](#).