

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
0.110	$\frac{1}{2}^-$	0	100	
0.197	$\frac{5}{2}^+$	0	100	
		0.110	< 0.06	
1.35	$\frac{5}{2}^-$	0.110	96.8 ± 1	0.0 ± 0.7^b
		0.197	3.2 ± 1	
1.46	$\frac{3}{2}^-$	0	20.5 ± 0.7	0.01 ± 0.03
		0.110	68.8 ± 0.9	0.248 ± 0.020
		0.197	10.7 ± 0.5	
		1.35	< 0.2^h	
1.55	$\frac{3}{2}^+$	0	2.55 ± 0.10	
		0.110	4.85 ± 0.12	
		0.197	92.6 ± 0.2	
		1.35	< 0.011^h	
		1.46	< 0.14^h	
2.78	$\frac{9}{2}^+$	0.197	100	
3.91	$\frac{3}{2}^+$	0	48 ± 2	
		0.110	17 ± 2	
		0.197	14 ± 2	
		1.55	21 ± 3	
4.00	$\frac{7}{2}^-$	0.197	18 ± 4	
		1.35	70 ± 4	
		1.46	12 ± 6	
4.03	$\frac{9}{2}^-$	1.35	100	
4.38 ^c	$\frac{7}{2}^+$	0	< 5	
		0.110	< 2	
		0.197	80.5 ± 2.0	0.155 ± 0.022
		2.78	19.5 ± 1.0	-0.16 ± 0.07
4.55 ^d	$\frac{5}{2}^+$	0.197	69 ± 7	
		1.35	5 ± 3	
		1.46	8 ± 3	
		1.55	18 ± 4	

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
4.56	$\frac{3}{2}^-$	0	36 ± 4	$ M ^2 = 3.1 \pm 0.3 \text{ W.u.}$ $0 < \delta < 2.0$ $-0.22^{+0.14}_{-0.24}$ $0.0 \pm 0.24 \text{ or } 2.0^{+1.5}_{-0.6}$ $\Gamma_\gamma/\Gamma = 0.83 \pm 0.10$ $ \delta < 1.4$ $\delta = 0.0 \pm 0.3$
		0.110	45 ± 5	
		0.197	9 ± 3	
		1.35	4 ± 3	
		1.46	< 4	
		1.55	6 ± 3	
4.65	$\frac{13}{2}^+$	2.78	100	
4.68	$\frac{5}{2}^-$	0.197	5.6 ± 0.9	
		1.35	63.1 ± 3.8	
		1.46	31.3 ± 2.2	
5.11 ⁱ	$\frac{5}{2}^+$	j	79.7 ± 3.7	
		1.35	< 1.6	
		1.46	10.4 ± 2.7	
		1.55	1.8 ± 1.8	
		2.78	0.7 ± 0.6	
		3.91	5.4 ± 0.9	
		4.38	2.0 ± 0.5	
		5.34	$\frac{1}{2}^{(+)}$	0
5.42	$\frac{7}{2}^-$	0.110	42 ± 4	
		1.46	20 ± 2	
		1.35	70	
5.46	$\frac{7}{2}^+$	1.46	13	
		4.00	10	
		4.03	6	
		0.197	4	
		1.35	32	
5.50	$\frac{3}{2}^+$	1.55	5	
		2.78	59	
		0.110	25	
		0.197	49	
		1.35	16	

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
5.54	$\frac{5}{2}^+$	1.55	11	
		0	7	
		0.197	47	
5.62	$\frac{3}{2}^-$	1.46	45	
		0.197	39 ± 4	
		1.35	61 ± 4	
5.94	$\frac{1}{2}^+$	0	7 ± 4	
		0.110	20 ± 6	
		0.197	2 ± 1	
		1.46	63 ± 6	0.25 ± 0.02
		1.55	< 2	
6.07	$\frac{7}{2}^+$	3.91	8 ± 3	0.28 ± 0.09
		0.197	54 ± 5	-0.26 ± 0.02
		1.35	19 ± 2	
		1.55	$1_{-0.5}^{+1}$	0.035 ± 0.023
		2.78	23 ± 3	0.06 ± 0.08
		4.38	4 ± 1	
		0	25 ± 4	-0.021 ± 0.014
6.09	$\frac{3}{2}^-$	0.110	61 ± 5	0.045 ± 0.021
		0.197	14 ± 3	0.014 ± 0.043
		0.197	31 ± 3	-0.045 ± 0.025
6.16	$\frac{7}{2}^-$	1.35	65 ± 4	0.077 ± 0.007
		1.46	1.3 ± 0.6	
		4.00	1.6 ± 0.6	
		4.03	2.3 ± 0.3	
		0	14 ± 2	-0.05 ± 0.07
6.28	$\frac{5}{2}^+$	0.197	4.2 ± 1.0	
		1.35	36 ± 2	-0.01 ± 0.09
		1.46	26 ± 2	-0.02 ± 0.04
		1.55	20 ± 2	0.11 ± 0.06
		0.197	56 ± 3	-0.27 ± 0.24
6.33	$\frac{7}{2}^+$	0.197	56 ± 3	

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
6.497	$\frac{3}{2}^+$	1.35	17 ± 2	-0.02 ± 0.03
		1.55	8.5 ± 1.5	0.00 ± 0.14
		4.38	18 ± 2	0.04 ± 0.20
		0	38 ± 2	-0.06 ± 0.04 or 2.00 ± 0.17
		0.110	14 ± 2	0.00 ± 0.03
		0.197	9 ± 2	$0.3 \rightarrow 1.8$
		1.35	14 ± 2	-0.11 ± 0.09
6.500	$\frac{11}{2}^+$	1.46	25 ± 2	0.00 ± 0.07
		2.78	55	
		4.65	45	
6.53	$\frac{3}{2}^+$	0	29 ± 2	0.32 ± 0.04 or 0.90 ± 0.06
		0.110	59 ± 3	0.00 ± 0.02
6.55	$\frac{7}{2}^{(+)}$	4.55	12 ± 2	-0.23 ± 0.13
		0.197	19 ± 2	0.03 ± 0.05
		1.35	55 ± 4	0.01 ± 0.03
6.59	$\frac{9}{2}^+$	2.78	26 ± 3	0.05 ± 0.07
		0.197	13 ± 2	-0.13 ± 0.13
		2.78	63 ± 3	-0.20 ± 0.20
6.79	$\frac{3}{2}^-$	4.38	24 ± 2	0.02 ± 0.07
		0	15 ± 2	-0.08 ± 0.03
		0.110	39 ± 2	0.11 ± 0.02
		0.197	13 ± 2	0.05 ± 0.06
6.84	$\frac{5}{2}^+$	1.35	5.3 ± 0.8	
		1.46	25 ± 2	-0.13 ± 0.08
		3.91	2.6 ± 1.0	
		0	9 ± 5	
		0.110	9 ± 5	
		0.197	27 ± 6	-0.5 ± 0.5
6.89	$\frac{3}{2}^-$	1.35	10 ± 7	
		1.46	45 ± 8	-0.02 ± 0.11
		0	9 ± 2	

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
6.93	$\frac{7}{2}^-$	1.35	61 ± 5	$0.22 \rightarrow 2.2$
		1.46	30 ± 5	0.15 ± 0.12
		0.197	73 ± 3	-0.01 ± 0.03
		1.35	22 ± 2	0.01 ± 0.02
		2.78	2.4 ± 0.5	0.00 ± 0.16
		4.00	1.3 ± 0.5	
7.17 ^e	$\frac{11}{2}^-$	4.03	1.3 ± 0.5	$\Gamma_\gamma/\Gamma = 0.025 \pm 0.003$
		4.00	5.6 ± 0.7	
		4.03	90.9 ± 0.8	
		4.65	3.5 ± 0.5	
7.54	$\frac{5}{2}^+; T = \frac{3}{2}$	0.197	29 ± 3	0.09 ± 0.04
		1.35	1.2 ± 0.4	
		1.55	41 ± 3	0.017 ± 0.015
		4.38	27 ± 3	0.042 ± 0.030
		5.11	1.7 ± 0.4	
7.66 ^f	$\frac{3}{2}^+; T = \frac{3}{2}$	0	38 ± 4	0.06 ± 0.02
		0.197	13 ± 2	0.06 ± 0.07 or 3.5 ± 1.1
		1.55	36 ± 2	0.06 ± 0.04
		3.91	(3_{-2}^{+3})	
		4.55	5.1 ± 0.3	-0.11 ± 0.13
		5.11	5.9 ± 0.5	-0.04 ± 0.16
		0.197	4	
		2.78	96	
		7.93	$\frac{7}{2}^+, \frac{9}{2}$	
7.94	$\frac{11}{2}^+$	2.78	10	
		4.65	90	
8.14	$\frac{1}{2}^+$	0	8 ± 1	
		0.11	24 ± 2	
		0.197	8 ± 1	
		1.55	2 ± 1	
		3.91	54 ± 2	Γ_γ (tot) = 1.3 eV
		5.94	1.0 ± 0.5	

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
8.25	$(\frac{5}{2}, \frac{7}{2})^-$	6.26	3 ± 1	Γ_γ (tot) = 72 ± 8 meV Γ_γ (tot) = 0.71 ± 0.17 eV $\delta = 0.02 \pm 0.05$ or 2.2 ± 0.6 $\delta = -0.14 \pm 0.07$
		0.197	18 ± 7	
		1.35	33 ± 10	
		1.46	24 ± 8	
		3.91	25 ± 8	
8.29 ^g	$\frac{13}{2}^-$	4.03	93 ± 4	
		4.65	7 ± 4	
		8.31	$\frac{5}{2}^+$	
1.55	48 ± 2			
4.38	40 ± 2			
8.37 ^g	$\frac{7}{2}, \frac{5}{2}^+$	0.197	13 ± 2	
		1.35	39 ± 3	
		2.78	30 ± 3	
		4.00	18 ± 3	
8.58	$\frac{5}{2}^+$	0	4 ± 1	
		0.197	38 ± 5	
		1.35	23 ± 3	
		1.55	20 ± 3	
		4.00	$(4 \pm 1)^g$	
		4.55	2.0 ± 0.7	
		5.42	4 ± 1	
		5.46	2.0 ± 0.5	
		5.62	2.2 ± 0.5	
		5.94	1.8 ± 0.5	
		6.16	2.5 ± 0.5	
		6.93	0.5 ± 0.3	
		8.59	$\frac{3}{2}^-$	0
0.11	3 ± 1			
0.197	42 ± 2			
1.35	7 ± 1			
1.55	28 ± 3			
	Γ_γ (tot) = 0.85 ± 0.17 eV			

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
8.63 ^g	$\frac{7}{2}^-$	3.91	8 ± 1	
		4.55	3.6 ± 0.6	
		5.11	1.0 ± 0.5	
		5.50	1.5 ± 0.5	
		6.28	0.6 ± 0.2	
		6.79	0.3 ± 0.1	
		0.197	34 ± 2	
		1.35	6 ± 1	
		1.46	6 ± 1	
		2.78	38 ± 2	
8.65	$\frac{1}{2}^+$	4.00	13 ± 1	
		4.03	3 ± 1	
		0.11	53 ± 6	
8.79	$\frac{1}{2}^+; T = \frac{3}{2}$	1.46	23 ± 6	
		3.91	24 ± 6	
		0	1.2 ± 0.4	
		0.11	30 ± 1	
		0.197	0.3 ± 0.2	
		1.46	22 ± 1	
		1.55	8 ± 1	
		3.91	22 ± 1	
		5.34	0.5 ± 0.1	
		5.94	1.8 ± 0.2	
		6.09	1.7 ± 0.2	
		6.26	0.2 ± 0.1	
		6.49	6 ± 1	
		6.53	2.1 ± 0.2	
		6.79	1.2 ± 0.3	
6.99	0.5 ± 0.1			
7.26	1.7 ± 0.2			
7.36	0.6 ± 0.1			

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ		
8.86 ^g 8.92	$< \frac{9}{2}$ $\frac{3}{2}^-$	7.66	0.2 ± 0.1			
		1.35	100			
		0	5 ± 2	0.1 ± 0.3 or 1.7 ± 0.9		
		0.11	10 ± 2	0.20 ± 0.04 or 2.9 ± 0.4		
		0.197	24 ± 7	1.0 ± 0.8		
		1.46	25 ± 7	3.0 ± 2.5		
		1.55	23 ± 7	0.30 ± 0.06 or ∞		
		3.91	13 ± 7			
		2.78	50 ± 2	Γ_γ (tot) = 230 ± 30 meV		
		4.00	26 ± 2			
8.95 ^g	$\frac{11}{2}^-$	4.03	9 ± 1			
		4.65	10 ± 2			
		5.42	5 ± 1			
		0.197	44 ± 5			
9.03 ^g	$\frac{5}{2}, \frac{7}{2}$	4.38	30 ± 5			
		6.07	26 ± 4			
9.100	$\frac{7}{2}^-$	0.197	2.0 ± 0.3	$\delta = 0.0 \pm 0.2$ or 2.5 ± 0.6		
		1.35	2.7 ± 0.3	-0.1 ± 0.3 or ∞		
		2.78	47 ± 2	-0.09 ± 0.10		
		4.00	2.5 ± 0.3	0.3 ± 0.3 or -2.2 ± 0.9		
		4.03	7.0 ± 0.5	-0.08 ± 0.01 or ∞		
		4.68	2.0 ± 0.3	-0.09 ± 0.34 or ∞		
		5.11	1.2 ± 0.2	0.0 ± 0.2 or 3.0 ± 1.6		
		5.42	19 ± 2	0.25 ± 0.10 or -6.0 ± 5.5		
		5.54	1.3 ± 0.7	0.1 ± 0.3		
		5.62	3.3 ± 0.3	0.17 ± 0.10		
		6.10	12 ± 1	0.0 ± 0.3		
		9.101 ^g	$\frac{7}{2}^+, \frac{9}{2}^+$	2.78	11 ± 2	
				4.00	24 ± 2	
4.38	24 ± 2					
6.07	15 ± 2					

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ		
9.17 ^g	$\frac{1}{2}^+$	6.33	10 ± 2			
		0.197	51 ± 2			
		1.55	30 ± 2			
9.20 ^g	$\frac{3}{2}$	4.56	19 ± 2			
		0	18 ± 2			
		0.110	46 ± 3			
		0.197	10 ± 4			
		1.35	26 ± 3			
9.27 ^g	$\frac{11}{2}^+, \frac{9}{2}^+$	2.78	27 ± 2			
		4.38	18 ± 2			
		4.65	55 ± 3			
		4.00	58 ± 3			
9.28 ^g	$(\frac{7}{2}, \frac{9}{2})^+$	4.03	42 ± 3			
		0	30 ± 1	0.10 ± 0.08 or 1.4 ± 0.3		
		0.197	12 ± 1	0.1 ± 0.4 or ≥ 0.6		
9.32	$\frac{1}{2}^+$	1.46	28 ± 1	0.1 ± 0.2		
		1.55	17 ± 1	-0.2 ± 0.3 or ≤ 0.9		
		3.91	3.0 ± 0.3	0.40 ± 0.05 or ≥ 2.3		
		4.56	3.2 ± 0.3	0.2 ± 0.3		
		4.68	6.8 ± 0.5	0.1 ± 0.2		
		1.55	100			
		9.33 ^g	$< \frac{5}{2}$	1.35	14 ± 2	
		9.51 ^g	$\frac{5}{2}^+, \frac{7}{2}^+$	1.55	14 ± 2	
2.78	72 ± 3					
9.54	$\frac{5}{2}^+$	1.35	26 ± 2	0.3 ± 1.1		
		4.56	15 ± 1	0.7 ± 0.4		
		4.68	12 ± 1	0.3 ± 0.3		
		5.11	29 ± 2	0.3 ± 0.2		
		7.54	10 ± 1	0.7 ± 0.3		
		7.66	6 ± 1	0.4 ± 0.3 or $1.0 \rightarrow 0.4$		
		8.02	2 ± 1			

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
9.566	$\frac{3}{2}^-$	0.197	77 ± 10	
		6.26	23 ± 6	
9.575	$\frac{3}{2}^-$	1.46	26 ± 2	-0.1 ± 0.2
		3.91	4 ± 1	-6 ± 7
		4.55	17 ± 2	
		6.09	38 ± 2	1.8 ± 1.0
		7.54	11 ± 2	-0.3 ± 0.8
		7.66	4 ± 1	-0.1 ± 1.3
9.59	$\frac{7}{2}$	1.35	32 ± 4	0.0 ± 0.5 or 3.7 ± 2.5
		2.78	30 ± 2	0.1 ± 0.2 or 11 ± 5
		4.00	17 ± 2	-0.7 ± 1.1
		4.55	21 ± 2	
9.64 ^g	$\frac{3}{2}, \frac{5}{2}$	0.197	13 ± 3	
		1.35	61 ± 7	
		4.55	26 ± 6	
9.65 ^g	$\frac{3}{2}, \frac{5}{2}$	1.35	41 ± 9	
		1.55	59 ± 9	
9.67	$\frac{3}{2}^+$	0	22 ± 2	-0.72 ± 0.04 or -10 ± 4
		0.11	20 ± 2	0.00 ± 0.05
		0.197	9 ± 1	0.30 ± 0.03 or 1.7 ± 0.3
		1.35	9 ± 1	0.00 ± 0.03
		1.46	5 ± 1	0.00 ± 0.07
		1.55	10 ± 1	0.00 ± 0.06 or -4.2 ± 1.3
		3.91	5.5 ± 0.5	0.12 ± 0.03 or -7.5 ± 2.0
		4.38	0.5 ± 0.2	
		4.55	8 ± 1	0.00 ± 0.03 or 4.7 ± 0.5
		5.11	1.5 ± 0.3	0.00 ± 0.05
		5.34	1.0 ± 0.2	-0.22 ± 0.03 or 3.3 ± 0.2
		6.84	1.0 ± 0.3	0.05 ± 0.02 or 3.3 ± 0.2
		7.54	4.0 ± 0.3	0.02 ± 0.03
7.66	3.5 ± 0.3	0.14 ± 0.04		

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ		
9.71 ^g	$\frac{9}{2}^+, \frac{11}{2}^-$	2.78	19 ± 3			
		4.03	80 ± 4			
		4.65	1 ± 1			
9.82	$\frac{5}{2}^-$	0.11	0.7 ± 0.2			
		0.197	41 ± 2	0.00 ± 0.05		
		1.35	2.4 ± 0.5	-0.6 ± 0.2		
		1.46	8 ± 1	-0.07 ± 0.05 or 2.7 ± 0.7		
		1.55	30 ± 2	0.01 ± 0.04		
		4.00	1.0 ± 0.2	0.0 ± 0.2 or ∞		
		4.55	0.5 ± 0.1	0.30 ± 0.15		
		4.68	4.8 ± 0.3	0.0 ± 0.1 or -1.7 ± 0.4		
		5.11	0.3 ± 0.2	0.4 ± 0.5 or ∞		
		5.42	10 ± 1	-0.04 ± 0.05 or ∞		
		5.54	0.6 ± 0.2	0.0 ± 0.2		
		5.62	0.7 ± 0.2	0.33 ± 0.15 or -3.4 ± 1.2		
		9.83 ^g	$\frac{11}{2} \rightarrow \frac{15}{2}$	4.65	100	
		9.87	$\frac{11}{2}^-$	2.78	63 ± 3	0.0 ± 0.2
				4.00	4.2 ± 1.0	
4.03	24 ± 2			-0.43 ± 0.05 or 2.2 ± 0.2		
4.65	2.1 ± 0.8					
6.10	3.8 ± 0.8			0.2 ± 0.1 or 2.7 ± 1.0		
6.50	1.9 ± 0.7			-0.4 ± 0.7		
8.29	1.0 ± 0.3					
9.89	$\frac{1}{2}^+$			0.197	15 ± 8	
		1.46	15 ± 5			
		3.91	32 ± 2			
		5.94	4 ± 1			
		6.09	13 ± 3			
		6.53	16 ± 2			
		7.66	5 ± 1			
9.93 ^g	$\frac{9}{2}^+$	0.197	1 ± 1			

Table 19.7 from (1987AJ02): Radiative transitions in ^{19}F ^a (continued)

E_i (MeV)	J_i^π	E_f (MeV)	Branching ratios (%)	δ
10.09 ^g	$\frac{5}{2}^-, \frac{7}{2}^-$	2.78	19 ± 1	
		5.46	10 ± 1	
		6.07	7 ± 1	
		6.33	8 ± 1	
		6.50	54 ± 2	
		0.197	10 ± 1	
		1.35	35 ± 2	
		4.00	19 ± 2	
10.14 ^g	$\frac{3}{2}^-$	5.42	26 ± 2	
		6.07	10 ± 1	
		1.35	29 ± 4	
10.37 ^g	$\frac{7}{2} \rightarrow \frac{11}{2}$	1.46	71 ± 4	
		4.03	100	
10.41 ^g	$\frac{13}{2}^+$	2.78	3 ± 1	
		4.68	88 ± 1	
		6.50	9 ± 1	

^a For references and other information see Tables 19.7 in (1978AJ03, 1983AJ01) and (1982OL02). See also Tables 19.8, 19.9 and 19.14 here. See also Table 2 in the Introduction of this compilation, and (1987FO03) for $B(E2)$.

^b $|M|^2 = 21.4 \pm 0.3$ W.u.

^c $\Gamma_\gamma/\Gamma = 0.91 \pm 0.05$.

^d $\Gamma_\gamma/\Gamma = 0.76 \pm 0.15$ for $4.55 \rightarrow 0.20$ transition.

^e (1985DI16).

^f $\Gamma_\gamma = 4.7$ eV, $\Gamma_\gamma/\Gamma = 0.65 \pm 0.10$.

^g Branching ratios are the relative intensities at $\theta = 55^\circ$.

^h (1982VE05).

ⁱ W.J. Vermeer, M.Sc. thesis, Auckland University (1980) and private communication (1986).

^j g.s. + 0.110 + 0.197.