

Table 2 from (1993TI07): Electromagnetic transitions in $A = 16 - 17$ ^a

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi(T_i) \rightarrow J_f^\pi(T_f)$	Γ_γ (eV)	Branching ratio (%)	Mult.	S (W.u.)
¹⁶ N ^b	0.12 \rightarrow 0	$0^-(1) \rightarrow 2^-(1)$	$(8.7 \pm 0.1) \times 10^{-11}$	100	E2	1.7 ± 0.1
	0.30 \rightarrow 0	$3^- \rightarrow 2^-$	$(5.00 \pm 0.08) \times 10^{-6}$	100	M1	$(9.00 \pm 0.15) \times 10^{-3}$
	0.40 \rightarrow 0	$1^- \rightarrow 2^-$	$(3.1 \pm 0.1) \times 10^{-5}$	26.6 ± 0.6	M1	$(2.36 \pm 0.08) \times 10^{-2}$
¹⁶ O ^c	\rightarrow 0.12	$\rightarrow 0^-$	$(8.6 \pm 0.2) \times 10^{-5}$	73.4 ± 1.6	M1	0.193 ± 0.004
	6.13 \rightarrow 0	$3^-(0) \rightarrow 0^+(0)$	$(2.60 \pm 0.13) \times 10^{-5}$	100	E3	13.5 ± 0.7
	6.92 \rightarrow 0	$2^+ \rightarrow 0^+$	0.097 ± 0.003	> 99	E2	3.1 ± 0.1
	\rightarrow 6.05	$\rightarrow 0^+$	$(2.7 \pm 0.3) \times 10^{-5}$	$(2.7 \pm 0.3) \times 10^{-2}$	E2	27 ± 3
	\rightarrow 6.13	$\rightarrow 3^-$	$\leq 9 \times 10^{-6}$	$\leq 8 \times 10^{-3}$	E1	$\leq 4 \times 10^{-5}$
	7.12 \rightarrow 0	$1^- \rightarrow 0^+$	$(5.5 \pm 0.3) \times 10^{-2}$	> 99	E1	$(3.5 \pm 0.2) \times 10^{-4}$
	\rightarrow 6.05	$\rightarrow 0^+$	$< 3 \times 10^{-7}$	$\leq 6 \times 10^{-4}$	E1	$< 6 \times 10^{-7}$
	\rightarrow 6.13	$\rightarrow 3^-$	$(4 \pm 1) \times 10^{-5}$	$(7.0 \pm 1.4) \times 10^{-2}$	E2	21 ± 5
	8.87 \rightarrow 0	$2^- \rightarrow 0^+$	$(2.6 \pm 0.4) \times 10^{-4}$	7.2 ± 0.8	M2	0.050 ± 0.008
	\rightarrow 6.05	$\rightarrow 0^+$	$(3.1 \pm 1.0) \times 10^{-6}$	0.122 ± 0.033	M2	0.18 ± 0.06
	\rightarrow 6.13	$\rightarrow 3^-$	$(3.0 \pm 0.4) \times 10^{-4}$	77.7 ± 1.6	M1	$(6.9 \pm 0.9) \times 10^{-4}$
	\rightarrow 6.92	$\rightarrow 2^+$	$(2.5 \pm 0.2) \times 10^{-3}$		E2	8.2 ± 0.7
	\rightarrow 7.12	$\rightarrow 1^-$	$(1.5 \pm 0.3) \times 10^{-4}$	3.6 ± 0.5	E1	$(4.7 \pm 0.9) \times 10^{-5}$
	\rightarrow 6.92	$\rightarrow 1^-$	$(8 \pm 3) \times 10^{-5}$	11.4 ± 0.5	M1	$(7.1 \pm 2.6) \times 10^{-4}$
	\rightarrow 6.92	$\rightarrow 2^+$	$(3.4 \pm 0.5) \times 10^{-4}$		E2	10.3 ± 1.5
	9.59 \rightarrow 0	$1^- \rightarrow 0^+$	$(2.5 \pm 0.4) \times 10^{-2}$		E1	$(6.6 \pm 1.1) \times 10^{-5}$
	\rightarrow 6.92	$1^- \rightarrow 2^+$	$(2.9 \pm 1.0) \times 10^{-3}$		E1	$(3.5 \pm 1.2) \times 10^{-4}$
	9.84 \rightarrow 0	$2^+ \rightarrow 0^+$	$(5.7 \pm 0.6) \times 10^{-3}$	61 ± 4	E2	0.031 ± 0.003
	\rightarrow 6.05	$\rightarrow 0^+$	$(1.9 \pm 0.4) \times 10^{-3}$	18 ± 4	E2	1.2 ± 0.3
	\rightarrow 6.92	$\rightarrow 2^+$	$(2.2 \pm 0.4) \times 10^{-3}$	21 ± 4	M1	$(4.2 \pm 0.8) \times 10^{-3}$
	10.36 \rightarrow 0	$4^+ \rightarrow 0^+$	$(5.6 \pm 2.0) \times 10^{-8}$		E4	3.7 ± 1.3
	\rightarrow 6.13	$\rightarrow 3^-$	$< 1 \times 10^{-3}$		E1	$< 3 \times 10^{-5}$
	\rightarrow 6.92	$\rightarrow 2^+$	$(6.2 \pm 0.6) \times 10^{-2}$	≈ 100	E2	65 ± 6
	10.96 \rightarrow 7.12	$0^- \rightarrow 1^-$	$(8 \pm 5) \times 10^{-2}$	> 99	M1	$(7 \pm 4) \times 10^{-2}$
	11.10 \rightarrow 6.13	$4^+ \rightarrow 3^-$	$(3.1 \pm 1.3) \times 10^{-3}$		E1	$(5.9 \pm 2.5) \times 10^{-5}$
	\rightarrow 6.92	$\rightarrow 2^+$	$(2.5 \pm 0.6) \times 10^{-3}$		E2	1.0 ± 0.3
	11.52 \rightarrow 0	$2^+ \rightarrow 0^+$	0.61 ± 0.02	91.7	E2	1.5 ± 0.5
	\rightarrow 6.05	$\rightarrow 0^+$	$(3.0 \pm 0.5) \times 10^{-2}$	4.2 ± 0.7	E2	3.1 ± 0.5
\rightarrow 6.92	$\rightarrow 2^+$	$(2.9 \pm 0.7) \times 10^{-2}$	4.0 ± 1.0	M1	0.014 ± 0.004	
\rightarrow 7.12	$\rightarrow 1^-$	$\leq 5 \times 10^{-3}$	≤ 0.8	E1	$\leq 1 \times 10^{-4}$	
12.44 \rightarrow 0	$1^- \rightarrow 0^+$	12 ± 2	≈ 100	E1	0.014 ± 0.002	
\rightarrow 6.05	$\rightarrow 0^+$	0.12 ± 0.04	1.2 ± 0.4	E1	$(1.1 \pm 0.4) \times 10^{-3}$	
12.53 \rightarrow 0	$2^- \rightarrow 0^+$	$(3.3 \pm 0.5) \times 10^{-2}$		M2	1.12 ± 0.17	
\rightarrow 6.13	$\rightarrow 3^-$	2.1 ± 0.2	60 ± 6	M1	0.38 ± 0.04	

Table 2 from (1993TI07): Electromagnetic transitions in $A = 16 - 17$ ^a (continued)

Nucleus	$E_{xi} \rightarrow E_{xf}$ (MeV)	$J_i^\pi(T_i) \rightarrow J_f^\pi(T_f)$	Γ_γ (eV)	Branching ratio (%)	Mult.	S (W.u.)
¹⁷ N ^d	$\rightarrow 6.92$	$\rightarrow 2^+$	< 0.34	< 10	E1	$< 4.5 \times 10^{-3}$
	$\rightarrow 7.12$	$\rightarrow 1^-$	0.5 ± 0.1	15 ± 3	M1	0.15 ± 0.03
	$\rightarrow 8.87$	$\rightarrow 2^-$	0.9 ± 0.1	25 ± 3	M1	0.9 ± 0.1
	$12.80 \rightarrow 7.12$	$0^-(1) \rightarrow 1^-(0)$	2.5 ± 0.2	≈ 100	M1	0.65 ± 0.06
	$12.97 \rightarrow 0$	$2^-(1) \rightarrow 0^+(0)$	$(3.4 \pm 0.9) \times 10^{-2}$		M2	0.97 ± 0.26
	$\rightarrow 6.13$	$\rightarrow 3^-(0)$	2.3 ± 0.2	63 ± 6	M1	0.34 ± 0.03
	$\rightarrow 7.12$	$\rightarrow 1^-(0)$	0.44 ± 0.10	12 ± 3	M1	0.10 ± 0.02
	$\rightarrow 8.87$	$\rightarrow 2^-(0)$	0.90 ± 0.10	25 ± 3	M1	0.62 ± 0.07
	$13.09 \rightarrow 0$	$1^-(1) \rightarrow 0^+(0)$	32 ± 5	≈ 100	E1	0.033 ± 0.005
	$\rightarrow 6.05$	$\rightarrow 0^+(0)$	0.26 ± 0.09	0.58 ± 0.12	E1	$(1.7 \pm 0.6) \times 10^{-3}$
	$\rightarrow 7.12$	$\rightarrow 1^-(0)$	1.4 ± 0.4	3.1 ± 0.8	M1	0.31 ± 0.09
	$1.37 \rightarrow 0$	$\frac{3}{2}^-(\frac{3}{2}) \rightarrow \frac{1}{2}^-(\frac{3}{2})$	$(7 \pm 3) \times 10^{-3}$	100	M1	0.13 ± 0.06
	$1.85 \rightarrow 0$	$\frac{1}{2}^+ \rightarrow \frac{1}{2}^-$	$(1.4_{-0.3}^{+0.7}) \times 10^{-5}$	86.5 ± 2.5	E1	$(5.0_{-1.0}^{+2.5}) \times 10^{-6}$
	$\rightarrow 1.37$	$\rightarrow \frac{3}{2}^-$	$(2.2_{-0.5}^{+1.1}) \times 10^{-6}$	13.5 ± 2.5	E1	$(4.4_{-1.0}^{+2.2}) \times 10^{-5}$
	$1.91 \rightarrow 0$	$\frac{5}{2}^- \rightarrow \frac{1}{2}^-$	$(4.6 \pm 0.9) \times 10^{-5}$	77.0 ± 2.5	E2	0.8 ± 0.2
	$\rightarrow 1.37$	$\rightarrow \frac{3}{2}^-$	$(1.4 \pm 0.3) \times 10^{-5}$	23.0 ± 2.5	M1	$(4.2 \pm 0.9) \times 10^{-3}$
	$2.53 \rightarrow 0$	$\frac{5}{2}^+ \rightarrow \frac{1}{2}^-$	$(2.2 \pm 0.3) \times 10^{-6}$	11 ± 1	M2	$(0.4_{-0.4}^{+1.3})$ (0.21 ± 0.03)
	$\rightarrow 1.37$	$\rightarrow \frac{3}{2}^-$	$(6.9 \pm 1.0) \times 10^{-6}$	34 ± 3	E1	$(9.8 \pm 1.5) \times 10^{-6}$
	$\rightarrow 1.85$	$\rightarrow \frac{1}{2}^+$	$(2.4 \pm 0.5) \times 10^{-6}$	12.0 ± 1.5	E2	7.7 ± 1.5
	$\rightarrow 1.91$	$\rightarrow \frac{5}{2}^-$	$(8.4 \pm 1.0) \times 10^{-6}$	41.0 ± 2.5	E1	$(7.8 \pm 0.9) \times 10^{-5}$
$3.13 \rightarrow 1.91$	$\frac{7}{2}^- \rightarrow \frac{5}{2}^-$	$(2.4 \pm 0.7) \times 10^{-3}$	100	M1	0.063 ± 0.018	
$3.63 \rightarrow 1.91$	$(\frac{7}{2}, \frac{9}{2})^- \rightarrow \frac{5}{2}^-$	$(2.6 \pm 0.8) \times 10^{-5}$	47 ± 10	E2	0.8 ± 0.3 ^g	
$\rightarrow 3.13$	$\rightarrow \frac{7}{2}^-$	$(2.9 \pm 1.0) \times 10^{-5}$	53 ± 10	M1	0.011 ± 0.004 ^g	
¹⁷ O ^e	$0.87 \rightarrow 0$	$\frac{1}{2}^+(\frac{1}{2}) \rightarrow \frac{5}{2}^+(\frac{1}{2})$	$(2.55 \pm 0.03) \times 10^{-6}$	100	E2	2.39 ± 0.03
	$3.06 \rightarrow 0.87$	$\frac{1}{2}^- \rightarrow \frac{1}{2}^+$	$(5.5_{-2.8}^{+3.7}) \times 10^{-3}$	100	E1	$(1.2_{-0.6}^{+0.8}) \times 10^{-3}$
	$3.84 \rightarrow 0$	$\frac{5}{2}^- \rightarrow \frac{5}{2}^+$	> 0.026	100	E1	$> 1 \times 10^{-3}$
	$4.55 \rightarrow 0$	$\frac{3}{2}^- \rightarrow \frac{5}{2}^+$	1.80 ± 0.35 ⁱ		E1	$(4.3 \pm 0.9) \times 10^{-2}$
	$\rightarrow 0.87$	$\rightarrow \frac{1}{2}^+$	1.85 ± 0.35 ⁱ		E1	$(8.3 \pm 1.5) \times 10^{-2}$
¹⁷ F ^f	$11.08 \rightarrow 0.87$	$\frac{1}{2}^-(\frac{3}{2}) \rightarrow \frac{1}{2}^+(\frac{1}{2})$	10 ± 3 ^h	100	E1	$(4.5 \pm 0.8) \times 10^{-2}$
	$0.50 \rightarrow 0$	$\frac{1}{2}^+(\frac{1}{2}) \rightarrow \frac{5}{2}^+(\frac{1}{2})$	$(1.60 \pm 0.03) \times 10^{-6}$	100	E2	25.0 ± 0.5
	$3.10 \rightarrow 0.50$	$\frac{1}{2}^- \rightarrow \frac{1}{2}^+$	$(12 \pm 2) \times 10^{-3}$	100	E1	$(1.5 \pm 0.3) \times 10^{-3}$
	$3.86 \rightarrow 0$	$\frac{5}{2}^- \rightarrow \frac{5}{2}^+$	0.11 ± 0.02	100	E1	$(4.3 \pm 0.8) \times 10^{-3}$
	$11.19 \rightarrow 0.50$	$\frac{1}{2}^-(\frac{3}{2}) \rightarrow \frac{1}{2}^+(\frac{1}{2})$	6.0 ± 2.5	100	E1	0.011 ± 0.005

^a See also (1979EN05). The last column gives the γ -ray strengths expressed in Weisskopf units [see (1960WI1A)]. The Weisskopf estimates (Γ_w in eV, E_γ in MeV) are:

$$\begin{aligned}\Gamma_w(\text{E1}) &= 6.8 \times 10^{-2} A^{2/3} E_\gamma^3, & \Gamma_w(\text{E2}) &= 4.9 \times 10^{-8} A^{4/3} E_\gamma^5, \\ \Gamma_w(\text{E3}) &= 2.3 \times 10^{-14} A^2 E_\gamma^7, & \Gamma_w(\text{E4}) &= 6.8 \times 10^{-21} A^{8/3} E_\gamma^9, \\ \Gamma_w(\text{M1}) &= 2.1 \times 10^{-2} E_\gamma^3, & \Gamma_w(\text{M2}) &= 1.5 \times 10^{-8} A^{2/3} E_\gamma^5.\end{aligned}$$

The values for these γ -ray strengths are occasionally different from those listed in other tables of this paper because different values of r_0 were used. In this table $r_0 = 1.2$ fm is used consistently. The multiplicities in the next to the last column were used to calculate the Γ_w .

^b See also [Table 16.5](#).

^c See also [Tables 16.13](#) and [16.14](#).

^d See also [Tables 17.2](#) and [17.4](#).

^e See also [Tables 17.10](#) and [17.16](#).

^f See also [Tables 17.23](#) and [17.24](#).

^g $\frac{9}{2}^-$ assumed for $^{17}\text{N}^*(3.63)$.

^h See footnote ⁱ of [Table 17.16](#).

ⁱ ([1992IG01](#)).