Table 3 from (1998TI06): Electromagnetic transitions in $A = 20$ nuclei [a]

Nucleus	$E_{\rm xi} \to E_{\rm xf}$ (MeV)	$J^\pi_{\rm i} \to J^\pi_{\rm f}$ [b]	Γ_γ (eV)	Mult.	S (W.u.)
^{20}O [c]	$1.67 \to 0$	$2^+ \to 0^+$	$(6.28 \pm 0.24) \times 10^{-5}$	E2	1.80 ± 0.07
^{20}F [d]	$0.656 \to 0$	$3^+ \to 2^+$	$(1.50 \pm 0.10) \times 10^{-3}$	M1	0.252 ± 0.017
	$0.823 \to 0$	$4^+ \to 2^+$	$(2.77 \pm 0.29) \times 10^{-6}$	E2	2.76 ± 0.29
	$\to 0.656$	$\to 3^+$	$(5.57 \pm 0.47) \times 10^{-6}$	M1	$(5.72 \pm 0.48) \times 10^{-2}$
	$0.984 \to 0$	$1^- \to 2^+$	$(3.36 \pm 0.15) \times 10^{-4}$	E1	$(7.04 \pm 0.32) \times 10^{-4}$
	$1.057 \to 0$	$1^+ \to 2^+$	$(8.9 \pm 1.9) \times 10^{-2}$	M1	3.59 ± 0.78
	$1.309 \to 0$	$2^- \to 2^+$	$(3.23 \pm 0.16) \times 10^{-4}$	E1	$(2.87 \pm 0.14) \times 10^{-4}$
	$\to 0.656$	$\to 3^+$	$(8.5 \pm 1.5) \times 10^{-6}$	E1	$(6.1 \pm 1.1) \times 10^{-5}$
	$\to 0.984$	$\to 1^-$	$(1.72 \pm 0.16) \times 10^{-5}$	M1	$(2.38 \pm 0.23) \times 10^{-2}$
	$\to 1.057$	$\to 1^+$	$(3.5 \pm 1.1) \times 10^{-6}$	E1	$(4.4 \pm 1.4) \times 10^{-4}$
	$1.844 \to 0$	$2^- \to 2^+$	$(9.11 \pm 0.69) \times 10^{-3}$	E1	$(2.90 \pm 0.22) \times 10^{-3}$
	$\to 0.656$	$\to 3^+$	$(6.68 \pm 0.71) \times 10^{-4}$	E1	$(7.96 \pm 0.85) \times 10^{-4}$
	$\to 1.309$	$\to 2^-$	$(1.89 \pm 0.33) \times 10^{-4}$	M1	$(5.9 \pm 1.1) \times 10^{-2}$
	$1.971 \to 0$	(3^-) [e] $\to 2^+$	$(1.91 \pm 0.34) \times 10^{-4}$	E1	$(4.98 \pm 0.88) \times 10^{-5}$
	$\to 0.823$	$\to 4^+$	$(5.60 \pm 0.88) \times 10^{-4}$	E1	$(7.4 \pm 1.2) \times 10^{-4}$
	$\to 0.984$	$\to 1^-$	$(8.6 \pm 4.5) \times 10^{-6}$	E2	3.5 ± 1.8
	$\to 1.309$	$\to 2^-$	$(3.20 \pm 0.57) \times 10^{-4}$	M1	$(5.27 \pm 0.94) \times 10^{-2}$
	$2.044 \to 0$	$2^+ \to 2^+$	$(1.27 \pm 0.25) \times 10^{-2}$	M1	$(7.1 \pm 1.4) \times 10^{-2}$
	$\to 0.656$	$\to 3^+$	0.155 ± 0.028	M1	2.76 ± 0.50
	$\to 1.309$	$\to 2^-$	$(1.18 \pm 0.55) \times 10^{-3}$	E1	$(5.94 \pm 2.76) \times 10^{-3}$
	$2.194 \to 0$	$3^+ \to 2^+$	$(7.6 \pm 2.3) \times 10^{-2}$	M1	0.34 ± 0.10
	$\to 0.823$	$\to 4^+$	$(8.2 \pm 2.4) \times 10^{-2}$	M1	1.52 ± 0.45
	$\to 1.309$	$\to 2^-$	$(2.9 \pm 1.1) \times 10^{-3}$	E1	$(8.3 \pm 3.1) \times 10^{-3}$
	$2.865 \to 0$	(3^-) [e] $\to 2^+$	$(8.7 \pm 2.0) \times 10^{-3}$	E1	$(7.3 \pm 1.7) \times 10^{-4}$
	$\to 0.656$	$\to 3^+$	$(1.09 \pm 0.57) \times 10^{-3}$	E1	$(2.0 \pm 1.1) \times 10^{-4}$
	$\to 0.823$	$\to 4^+$	$(2.7 \pm 1.1) \times 10^{-3}$	E1	$(6.3 \pm 2.6) \times 10^{-4}$
	$\to 1.309$	$\to 2^-$	$(2.70 \pm 0.70) \times 10^{-3}$	M1	$(3.42 \pm 0.88) \times 10^{-2}$
	$\to 1.844$	$\to 2^-$	$(1.61 \pm 0.59) \times 10^{-3}$	M1	$(7.2 \pm 2.7) \times 10^{-2}$
	$\to 1.971$	$\to (3^-)$	$(1.61 \pm 0.59) \times 10^{-3}$	M1	0.107 ± 0.039
	$\to 2.044$	$\to 2^+$	$(2.7 \pm 1.1) \times 10^{-3}$	E1	$(9.75 \pm 3.92) \times 10^{-3}$

Table 3 from (1998TI06): Electromagnetic transitions in $A = 20$ nuclei [a] (continued)

Nucleus	$E_{\rm xi} \to E_{\rm xf}$ (MeV)	$J^\pi_{\rm i} \to J^\pi_{\rm f}$ [b]	Γ_γ (eV)	Mult.	S (W.u.)
	$\to 2.194$	$\to 3^+$	$(1.61 \pm 0.59) \times 10^{-3}$	E1	$(1.07 \pm 0.39) \times 10^{-2}$
	$2.966 \to 0$	$3^+ \to 2^+$	$(3.43 \pm 0.75) \times 10^{-2}$	M1	$(6.3 \pm 1.4) \times 10^{-2}$
	$\to 0.656$	$\to 3^+$	$(1.54 \pm 0.36) \times 10^{-2}$	M1	$(6.0 \pm 1.4) \times 10^{-2}$
	$\to 0.823$	$\to 4^+$	$(7.4 \pm 1.6) \times 10^{-2}$	M1	0.357 ± 0.076
	$\to 2.194$	$\to 3^+$	$(3.0 \pm 1.0) \times 10^{-3}$	M1	0.32 ± 0.11
	$3.488 \to 0$	$1^+ \to 2^+$	$(4.08 \pm 0.28) \times 10^{-2}$	M1	$(4.58 \pm 0.32) \times 10^{-2}$
	$\to 0.984$	$\to 1^-$	$(2.14 \pm 0.31) \times 10^{-3}$	E1	$(2.71 \pm 0.39) \times 10^{-4}$
	$\to 1.057$	$\to 1^+$	$(4.0 \pm 1.7) \times 10^{-3}$	M1	$(1.32 \pm 0.55) \times 10^{-2}$
	$\to 1.309$	$\to 2^-$	$(5.18 \pm 0.50) \times 10^{-3}$	E1	$(9.98 \pm 0.97) \times 10^{-4}$
	$\to 1.844$	$\to 2^-$	$(4.16 \pm 0.47) \times 10^{-3}$	E1	$(1.87 \pm 0.21) \times 10^{-3}$
	$3.526 \to 1.057$	(0^+) [e] $\to 1^+$	0.120 ± 0.013	M1	0.378 ± 0.042
	$6.63 \to 0$	$2^- \to 2^+$	$(2.8 \pm 0.9) \times 10^{-2}$	E1	$(1.9 \pm 0.6) \times 10^{-4}$
	$\to 0.656$	$\to 3^+$	$(8.4 \pm 2.3) \times 10^{-2}$	E1	$(7.9 \pm 2.2) \times 10^{-4}$
	$\to 1.309$	$\to 2^-$	0.43 ± 0.09	M1	0.14 ± 0.03
	$\to 1.844$	$\to 2^-$	0.11 ± 0.04	M1	$(4.8 \pm 1.7) \times 10^{-2}$
	$\to 1.971$	$\to (3^-)$ [e]	0.64 ± 0.15	M1	0.30 ± 0.07
	$\to 2.044$	$\to 2^+$	$(2.1 \pm 1.5) \times 10^{-2}$	E1	$(4.4 \pm 3.1) \times 10^{-4}$
	$\to 3.488$	$\to 1^+$	$(4.2 \pm 1.6) \times 10^{-2}$	E1	$(2.7 \pm 1.0) \times 10^{-3}$
	$\to 4.082$	$\to (1)^+$ [e]	$(3.5 \pm 1.6) \times 10^{-2}$	E1	$(4.2 \pm 1.9) \times 10^{-3}$
	$6.65 \to 0.984$	$1^- \to 1^-$	0.29 ± 0.08	M1	$(7.6 \pm 2.1) \times 10^{-2}$
	$\to 1.057$	$\to 1^+$	0.14 ± 0.07	E1	$(1.6 \pm 0.8) \times 10^{-3}$
	$\to 2.044$	$\to 2^+$	0.94 ± 0.20	E1	$(1.9 \pm 0.4) \times 10^{-2}$
	$\to 3.488$	$\to 1^+$	0.22 ± 0.09	E1	$(1.4 \pm 0.6) \times 10^{-2}$
^{20}Ne [f]	$1.63 \to 0$	$2^+ \to 0^+$	$(6.3 \pm 0.3) \times 10^{-4}$	E2	20.3 ± 1.0
	$4.25 \to 1.63$	$4^+ \to 2^+$	$(7.1 \pm 0.7) \times 10^{-3}$	E2	22 ± 2
	$4.97 \to 0$	$2^- \to 0^+$	$(8.2 \pm 2.8) \times 10^{-7}$	M2	$(2.5 \pm 0.8) \times 10^{-3}$
	$\to 1.63$	$2^- \to 2^+$	$(1.36 \pm 0.14) \times 10^{-4}$	E1	$(7.3 \pm 0.8) \times 10^{-6}$
			$(7.9 \pm 2.0) \times 10^{-7}$	M2	$(1.7 \pm 0.4) \times 10^{-2}$
			$(2.5 \pm 1.0) \times 10^{-7}$	E3	6 ± 2
	$5.62 \to 0$	$3^- \to 0^+$	$(1.8 \pm 0.6) \times 10^{-5}$	E3	11 ± 4

Table 3 from (1998TI06): Electromagnetic transitions in $A = 20$ nuclei [a] (continued)

Nucleus	$E_{\rm xi} \to E_{\rm xf}$ (MeV)	$J^\pi_{\rm i} \to J^\pi_{\rm f}$ [b]	Γ_γ (eV)	Mult.	S (W.u.)
	$\to 1.63$	$\to 2^+$	$(2.1 \pm 0.6) \times 10^{-4}$	E1	$(6.6 \pm 1.9) \times 10^{-6}$
	$\to 4.97$	$\to 2^-$	$(1.2 \pm 0.5) \times 10^{-5}$	M1	$(2.0 \pm 0.9) \times 10^{-3}$
	$5.79 \to 0$	$1^- \to 0^+$	$(8.0 \pm 0.3) \times 10^{-4}$	E1	$(8.3 \pm 0.3) \times 10^{-6}$
	$\to 1.63$	$\to 2^+$	$(3.8 \pm 0.8) \times 10^{-3}$	E1	$(1.1 \pm 0.2) \times 10^{-4}$
	$6.72 \to 1.63$	$0^+ \to 2^+$	3.3×10^{-2}	E2	3.6
	$7.004 \to 1.634$	$4^- \to 2^+$	$(7.5 \pm 3.4) \times 10^{-6}$	M2	$(1.52 \pm 0.68) \times 10^{-2}$
	$\to 4.248$	$\to 4^+$	$(1.94 \pm 0.40) \times 10^{-4}$	E1	$(1.85 \pm 0.38) \times 10^{-5}$
	$\to 4.967$	$\to 2^-$	$(9.7 \pm 2.0) \times 10^{-4}$	E2	10.3 ± 2.1
	$\to 5.621$	$\to 3^-$	$(3.29 \pm 0.67) \times 10^{-4}$	M1	$(5.9 \pm 1.2) \times 10^{-3}$
	$7.16 \to 4.25$	$3^- \to 4^+$	$(9.7 \pm 1.1) \times 10^{-4}$	E1	$(7.9 \pm 0.9) \times 10^{-5}$
	$\to 5.79$	$\to 1^-$	$(6.4 \pm 1.0) \times 10^{-4}$	E2	50 ± 8
	$7.19 \to 1.63$	$0^+ \to 2^+$	$(4.4 \pm 0.8) \times 10^{-3}$	E2	0.31 ± 0.06
	$7.42 \to 1.63$	$2^+ \to 2^+$	$(4.1 \pm 1.3) \times 10^{-4}$	M1	$(1.0 \pm 0.3) \times 10^{-4}$
			$(2.9 \pm 0.4) \times 10^{-2}$	E2	1.7 ± 0.2
	$7.83 \to 0$	$2^+ \to 0^+$	$(5.7 \pm 0.7) \times 10^{-2}$	E2	0.73 ± 0.09
	$\to 1.63$	$\to 2^+$	$(1.2 \pm 0.2) \times 10^{-2}$	M1	$(2.3 \pm 0.3) \times 10^{-3}$
	$8.45 \to 5.62$	$5^- \to 3^-$	$(1.3 \pm 0.3) \times 10^{-2}$	E2	27 ± 6
	$8.71 \to 0$	$1^- \to 0^+$	$(6.1 \pm 1.6) \times 10^{-2}$	E1	$(1.9 \pm 0.5) \times 10^{-4}$
	$\to 1.63$	$\to 2^+$	$(9 \pm 6) \times 10^{-3}$	E1	$(5 \pm 3) \times 10^{-5}$
	$8.78 \to 4.25$	$6^+ \to 4^+$	0.100 ± 0.015	E2	20 ± 3
	$9.03 \to 1.63$	$4^+ \to 2^+$	0.340 ± 0.042	E2	5.8 ± 0.7
	$9.12 \to 1.63$	$3^- \to 2^+$	$(1.3 \pm 0.2) \times 10^{-2}$	E1	$(6.2 \pm 1.0) \times 10^{-5}$
	$\to 4.97$	$\to 2^-$	$(8.6 \pm 1.7) \times 10^{-3}$	M1	$(5.8 \pm 1.1) \times 10^{-3}$
	$\to 5.62$	$\to 3^-$	$(4.4 \pm 1.1) \times 10^{-3}$	M1	$(4.9 \pm 1.2) \times 10^{-3}$
	$9.49 \to 1.63$	$2^+ \to 2^+$	0.26 ± 0.10	M1	$(2.5 \pm 1.0) \times 10^{-2}$
	$9.99 \to 1.63$	$4^+ \to 2^+$	0.90 ± 0.40	E2	8.3 ± 3.7
	$10.27 \to 0$	$2^+; 1 \to 0^+$	$(2.9 \pm 0.8) \times 10^{-2}$	E2	$(9.5 \pm 2.6) \times 10^{-2}$
	$\to 1.63$	$\to 2^+$	4.08 ± 0.44	M1	0.30 ± 0.03
	$\to 4.97$	$\to 2^-$	$(6.0 \pm 0.8) \times 10^{-2}$	E1	$(8.0 \pm 1.1) \times 10^{-4}$
	$\to 5.62$	$\to 3^-$	$(9.7 \pm 1.4) \times 10^{-2}$	E1	$(1.9 \pm 0.3) \times 10^{-3}$

Table 3 from (1998TI06): Electromagnetic transitions in $A = 20$ nuclei [a] (continued)

Nucleus	$E_{\rm xi} \to E_{\rm xf}$ (MeV)	$J^\pi_{\rm i} \to J^\pi_{\rm f}$ [b]	Γ_γ (eV)	Mult.	S (W.u.)
	$\to 7.42$	$\to 2^+$	0.31 ± 0.04	M1	0.64 ± 0.08
	$\to 7.83$	$\to 2^+$	$(8.0 \pm 2.0) \times 10^{-3}$	M1	$(2.6 \pm 0.7) \times 10^{-2}$
	$10.61 \to 7.00$	$6^- \to 4^-$	$(2.7 \pm 0.9) \times 10^{-2}$	E2	17 ± 6
	$\to 8.45$	$\to 5^-$	$(1.3 \pm 0.6) \times 10^{-3}$	M1	$(6.1 \pm 2.8) \times 10^{-3}$
	$11.09 \to 1.63$	$4^+; 1 \to 2^+$	$(2.0 \pm 1.0) \times 10^{-3}$	E2	$(1.0 \pm 0.5) \times 10^{-2}$
	$\to 4.25$	$\to 4^+$	0.338 ± 0.040	M1	$(5.0 \pm 0.6) \times 10^{-2}$
	$11.26 \to 0$	$1^+; 1 \to 0^+$	11.2 ± 2.0	M1	0.37 ± 0.07
	$\to 1.63$	$\to 2^+$	2.1 ± 0.7	M1	0.11 ± 0.04
	$11.27 \to 0$	$1^-; 1 \to 0^+$	0.390 ± 0.047	E1	$(5.4 \pm 0.7) \times 10^{-4}$
	$\to 1.63$	$\to 2^+$	$(1.8 \pm 0.7) \times 10^{-2}$	E1	$(4.0 \pm 1.6) \times 10^{-5}$
	$\to 4.97$	$\to 2^-$	$(4.6 \pm 0.9) \times 10^{-2}$	M1	$(8.8 \pm 1.7) \times 10^{-3}$
	$\to 8.85$	$\to 1^-$	0.189 ± 0.024	M1	0.63 ± 0.08
	$\to 9.32$	$\to (2^-)$ [e]	$(6.3 \pm 1.0) \times 10^{-2}$	M1	0.40 ± 0.06
	$11.93 \to 1.63$	$4^+ \to 2^+$	$(5.5 \pm 3.0) \times 10^{-3}$	E2	$(1.8 \pm 1.0) \times 10^{-2}$
	$\to 4.25$	$\to 4^+$	$(2.05 \pm 0.55) \times 10^{-2}$	M1	$(2.2 \pm 0.6) \times 10^{-3}$
	$11.95 \to 8.78$	$8^+ \to 6^+$	$(7.7 \pm 1.1) \times 10^{-3}$	E2	9.0 ± 1.3
	$12.40 \to 1.63$	$3^-; (1) \to 2^+$	8×10^{-2}	E1	1.3×10^{-4}
	$\to 4.25$	$\to 4^+$	0.2	E1	7.4×10^{-4}
	$12.43 \to 1.63$	$0^+ \to 2^+$	0.17 ± 0.05	E2	0.43 ± 0.13
	$18.43 \to 12.22$	$2^+; 2 \to 2^+; 1$	0.3	M1	6×10^{-2}

[a] See also (1979EN05). The last columns give the γ-ray strengths, S, [see (1979EN05)] expressed in Weisskopf units (see D.H. Wilkinson, in *Nuclear Spectroscopy Part B*, ed. F. Ajzenberg-Selove (Academic Press, NY, 1960)). The Weisskopf estimates ($\Gamma_{\rm w}$ in eV, E_γ in MeV) are:

$$\Gamma_{\rm w}({\rm E1}) = 6.8\times10^{-2}\ A^{2/3}E_\gamma^3, \qquad \Gamma_{\rm w}({\rm E2}) = 4.9\times10^{-8}\ A^{4/3}E_\gamma^5,$$
$$\Gamma_{\rm w}({\rm E3}) = 2.3\times10^{-14}\ A^{2}E_\gamma^7, \qquad \Gamma_{\rm w}({\rm E4}) = 6.8\times10^{-21}\ A^{8/3}E_\gamma^9,$$
$$\Gamma_{\rm w}({\rm M1}) = 2.1\times10^{-2}\ E_\gamma^3, \qquad \Gamma_{\rm w}({\rm M2}) = 1.5\times10^{-8}\ A^{2/3}E_\gamma^5.$$

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 multipolarities in the next to the last column were used to calculate $\Gamma_{\rm w}$.

[b] T shown in usual convention [J^π; T] only if transitions from the initial state involve a change in T.

[c] See also Table 20.2.

[d] See also Tables 20.5, 20.6, 20.9 and 20.10.

[e] Assuming this J^π.

[f] See also Tables 20.17 and 20.18.