Table 11.4 from (1990AJ01): Electromagnetic transitions in ^{11}B [a]

Initial state	J^π	Γ_γ (total) (eV)	Branching ratios (%) to final state						
			g.s.	2.12	4.44	5.02	6.74	6.79	7.29
2.12	$\frac{1}{2}^-$	0.120 ± 0.009	100						
4.44 [b]	$\frac{5}{2}^-$	0.56 ± 0.02	100 [d]						
5.02 [b]	$\frac{3}{2}^-$	1.963 ± 0.067	85.6 ± 0.6 [e]	14.4 ± 0.6 [f]					
6.74 [b]	$\frac{7}{2}^-$	0.030 ± 0.007	70 ± 2 [g]	< 3	30 ± 2	< 1			
6.79 [b]	$\frac{1}{2}^+$	0.385 ± 0.044	67.5 ± 1.1	28.5 ± 1.1	< 0.04	4.0 ± 0.3			
7.29 [b]	$\frac{5}{2}^+$	1.149 ± 0.080	87.0 ± 2.0	< 1	5.5 ± 1	7.5 ± 1			
7.98 [b]	$\frac{3}{2}^+$	1.15 ± 0.15	46.2 ± 1.1	53.2 ± 1.2	< 0.06	< 0.09		< 0.10	0.85 ± 0.04
8.56 [b]	$(\frac{3}{2}^-)$ [i]	0.946 ± 0.090	56 ± 2	30 ± 2	5 ± 1	9 ± 1			
8.92 [b]	$\frac{5}{2}^-$	4.368 ± 0.021	95 ± 1 [h]	< 1	4.5 ± 0.5	< 1	< 1	< 1	
9.19 [c]	$\frac{7}{2}^+$	$0.17^{+0.06}_{-0.03}$	0.9 ± 0.3		86.6 ± 2.3		12.5 ± 1.1	< 1.3	
9.27 [c]	$\frac{5}{2}^+$	1.15 ± 0.16	18.4 ± 0.9		69.7 ± 1.4		11.9 ± 0.6	< 0.6	

[a] See discussion in (1982MI08). See also Table 11.4 in (1980AJ01) and Tables 11.5 and 11.13 here.

[b] See also (1965OL03).

[c] Weighted mean of branching ratios and Γ_γ (1984HA13). Earlier work is also included: see (1984HA13).

[d] $\delta = -0.19 \pm 0.03$.

[e] $\delta = 0.03 \pm 0.05$.

[f] $\delta = -0.05 \pm 0.02$.

[g] $\delta = -0.45 \pm 0.18$. This value leads to too large a value of Γ_γ for an M3 transition (P.M. Endt, private communication).

[h] $\delta = -0.11 \pm 0.04$.

[i] This is probably the ^{11}B analog of ^{11}C*(8.10). If so $J^\pi = \frac{3}{2}^-$.

Comments [mainly from (1965OL03, 1962GR07)]

(1) *4.44 MeV*. $9.28 \to 4.44 \to 0$ angular distribution fixes $J = \frac{5}{2}$. Odd parity determined from direct interaction assignments.

(2) *5.02 MeV*. Internal pair correlation permit M1, E2 for the g.s. transition: $J^\pi \leq \frac{7}{2}^-$ (parity from l-assignments). τ_m excludes $\frac{7}{2}$, branch to 2.12, $\frac{5}{2}$. Angular correlation fixes $\frac{3}{2}^-$.

(3) *6.74 MeV*. Internal pairs indicate practically pure E2 g.s. radiation. Angular distributions and branching ratios (and l-assignments) all lead to $\frac{7}{2}^-$.

(4) *6.79 MeV*. The allowed β-decay from ^{11}Be [$J^\pi = \frac{1}{2}^+$] requires $J^\pi \leq \frac{3}{2}^+$. The relatively strong γ-branch to ^{11}B*(2.12) favors $\frac{1}{2}^+$, $\frac{3}{2}^+$. All γ's from this level are isotropic, suggesting $J^\pi = \frac{1}{2}^+$, but not excluding $\frac{3}{2}^+$.
(5) *7.29 MeV*. The g.s. transition is mainly E1, so $J^\pi \leq \frac{5}{2}^+$. The assignment $\frac{1}{2}^+$ is excluded by the strength of (7.29→4.44). $J^\pi = \frac{5}{2}^+$ is consistent with $\log ft > 8.04$ in the ^{11}Be β-decay.
(6) *7.98 MeV*. Transitions to ^{11}B(0, 2.12) are predominantly E1; thus ^{11}B*(7.98) has even parity, and the odd parity of ^{11}B*(2.12) is confirmed. The transition to ^{11}B*(2.12) is not isotropic, so $J^\pi = \frac{3}{2}^+$.
(7) *8.56 MeV*. Correlation of internal pairs indicate that the g.s. transition is M1 + E2 or E1 + M2, $J^\pi =\leq \frac{5}{2}^+$ or $\leq \frac{7}{2}^+$; the lifetime to ^{11}B*(2.12) excludes $\frac{7}{2}^-$. If the level has even parity, the required M2 admixture is excessive. $J^\pi \leq \frac{5}{2}^-$ is favored. See also footnote [i] in Table 11.4.
(8) *8.92 MeV*. From ^{7}Li(α, γ)^{11}B, $J^\pi = \frac{3}{2}^+, \frac{5}{2}^+, \frac{5}{2}^-$. The internal pair correlation confirms $\frac{5}{2}^-$. For higher states see comments under individual reactions and (1968AJ02).