

²²Ne(α ,n γ) **1976Ch29,1975Bu14,1974Ro10**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	R. B. Firestone	NDS 110, 1691 (2009)	1-Feb-2008

1976Ch29: ²²Na(α ,n γ), E=10 MeV. Measured $\alpha\gamma$ -,n γ -, $\gamma\gamma$ -coin. Ge(Li) detector.
1975Bu14: ²²Na(α ,n γ), E=8.00, 9.15 MeV. Measured $\sigma(E\gamma,\theta)$, linear polarization.
1974Ro10: ²²Na(α ,n γ), E=8, 8.8 MeV. Measured $\gamma(\theta),\pi\gamma(\theta)$,DSA. Ge(Li) detectors, Ge(Li)-NaI(Tl) pair spectrometer.
 Other reference: **1972Ke13**.

²⁵Mg Levels

E(level) [†]	J ^{π} @	E(level) [†]	J ^{π} @	T _{1/2} ^a
0	5/2 ⁺	4711.5 5	9/2 ⁺	
585.1 2	1/2 ⁺	4723.6 2I	1/2,3/2,5/2 ^{&}	
974.8 1	3/2 ⁺	5012.2 4	7/2 ⁺	
1611.8 1	7/2 ⁺	5116.3 [‡] 10	1/2 ⁻	
1964.6 2	5/2 ⁺	5251.3 3	11/2 ⁺	31 fs 10
2564.1 6	1/2 ⁺	5460.8 5	13/2 ⁺	>0.7 ps
2738.2 6	7/2 ⁺ &	5474 [‡]	1/2 ⁺	
2801.1 2	3/2 ⁺ &	5520.7 [‡] 5	5/2 ⁻	
3404.9 4	9/2 ⁺ &	5533.4 5	11/2 ⁺	
3414.2 13	3/2 ⁻ &	5747 [#]	5/2 ⁽⁺⁾	
3908.3 15	5/2 ⁺ &	5793.0 5	11/2 ⁻ ,7/2 ⁻	52 fs 17
3970.6 4	7/2 ⁻ &	5859 [‡]	5/2 ⁺	
4058.9 5	9/2 ⁺ &	5970.9 5	9/2 ⁺	52 fs 17
4277.0 2	1/2,3/2 ^{&}	5977.0 10	7/2 ⁺	
4359.4 2	3/2 ⁺ &	6041.3 [#] 5	11/2 ⁺ ,7/2 ⁺	

[†] From **1976Ch29** except as noted.
[‡] From **1975Bu14**.
[#] From **1974Ro10**, energy increased by 9 keV for consistency with later measurements.
[@] From Adopted Levels except as noted.
[&] From $\gamma\gamma(\theta)$ and γ -ray polarization measurements (**1972Ke13**).
^a From **1974Ro10**.

$\gamma(^{25}\text{Mg})$

E _{γ} [†]	I _{γ} [#]	E _i (level)	J _{i} ^{π}	E _f	J _{f} ^{π}	Mult.	δ ^{&}	Comments
389.7 [‡] 1	46 3	974.8	3/2 ⁺	585.1	1/2 ⁺	M1+E2	+0.12 3	
585.1 2	100	585.1	1/2 ⁺	0	5/2 ⁺			
773.1 7	7.0 6	2738.2	7/2 ⁺	1964.6	5/2 ⁺			
837.3 6	40 1	2801.1	3/2 ⁺	1964.6	5/2 ⁺	M1+E2	<-0.25	$\delta: -2.0 < \delta < -0.25$ (1972Ke13).
863.3 20	3 2	4277.0	1/2,3/2	3414.2	3/2 ⁻			
974.8 [‡] 1	54 3	974.8	3/2 ⁺	0	5/2 ⁺	M1+E2	<-0.12	I _{γ} : Weighted average of 57 1 (1975Bu14) and 52 1 (1976Ch29). $\delta: \text{or } > -3.5$.
989.8 [‡] 1	26 1	1964.6	5/2 ⁺	974.8	3/2 ⁺	M1+E2	-0.25 7	
1041.0 12	1.0 5	5012.2	7/2 ⁺	3970.6	7/2 ⁻			
1104.3 18	2.0 5	5012.2	7/2 ⁺	3908.3	5/2 ⁺			
1105.9 16	12 3	3908.3	5/2 ⁺	2801.1	3/2 ⁺			

Continued on next page (footnotes at end of table)

$^{22}\text{Ne}(\alpha, n\gamma)$ **1976Ch29,1975Bu14,1974Ro10** (continued) $\gamma(^{25}\text{Mg})$ (continued)

E_γ †	I_γ #	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	δ &	Comments	
1170.1	16	10 2	3908.3	5/2 ⁺	2738.2	7/2 ⁺			
1192.4	‡ 6	19 6	5251.3	11/2 ⁺	4058.9	9/2 ⁺	M1+E2	+0.32 8	δ : Other value: +0.44 15 (1974Ko10).
1380.0	4	46 2	1964.6	5/2 ⁺	585.1	1/2 ⁺			
1550.1	‡ 5	17 3	5520.7	5/2 ⁻	3970.6	7/2 ⁻	M1(+E2)	0.00 3	
1589.4	7	16 1	2564.1	1/2 ⁺	974.8	3/2 ⁺			
1611.7	‡ 1	100	1611.8	7/2 ⁺	0	5/2 ⁺	M1+E2	-0.22 2	
1702		3 1	5116.3	1/2 ⁻	3414.2	3/2 ⁻			
1713.3	15	12 2	4277.0	1/2,3/2	2564.1	1/2 ⁺			
1763.5	7	87 1	2738.2	7/2 ⁺	974.8	3/2 ⁺	E2	<i>b</i>	
1793.1	‡ 3	79 2	3404.9	9/2 ⁺	1611.8	7/2 ⁺	M1+E2	-0.14 2	δ : Other value: -0.15 2 (1972Ke13).
1795.0	15	1.0 5	4359.4	3/2 ⁺	2564.1	1/2 ⁺			
1822.4	‡ 2	34 2	5793.0	11/2 ⁻ ,7/2 ⁻	3970.6	7/2 ⁻	E2(+M3)	+0.07 7	δ : Assuming $J^\pi=11/2^-$. Other value: -0.01 2 (1974Ko10).
1846.4	‡ 5	23 6	5251.3	11/2 ⁺	3404.9	9/2 ⁺	M1+E2	+0.18 3	δ : Other value: +0.13 4 (1974Ko10).
1912.0	‡ 2	50 7	5970.9	9/2 ⁺	4058.9	9/2 ⁺	M1(+E2)	0.00 7	δ : Other value: 0.00 15 (1974Ko10).
1965.0	3	28 2	1964.6	5/2 ⁺	0	5/2 ⁺			
1973.9	14	6 2	4711.5	9/2 ⁺	2738.2	7/2 ⁺			
1978.5		25 @ 8	6041.3	11/2 ⁺ ,7/2 ⁺	4058.9	9/2 ⁺			
1978.9	7	81 1	2564.1	1/2 ⁺	585.1	1/2 ⁺			
2006.0	‡ 3	23 2	3970.6	7/2 ⁻	1964.6	5/2 ⁺	E1+M2	-0.04 4	δ : Other value: +0.02 2 (1972Ke13).
2055.9	‡ 2	100	5460.8	13/2 ⁺	3404.9	9/2 ⁺	E2(+M3)	+0.02 2	
2060		3 2	5474	1/2 ⁺	3414.2	3/2 ⁻			
2128.5	‡ 6	62 4	5533.4	11/2 ⁺	3404.9	9/2 ⁺	M1+E2	-0.119 9	δ : Other value: -0.14 5 (1974Ko10).
2210.1	11	17 2	5012.2	7/2 ⁺	2801.1	3/2 ⁺			
2217.2	5	41 2	2801.1	3/2 ⁺	585.1	1/2 ⁺	M1(+E2)		δ : -2.3< δ <+0.11 (1972Ke13).
2388.1	‡ 2	66 2	5793.0	11/2 ⁻ ,7/2 ⁻	3404.9	9/2 ⁺	E1(+M2)	+0.02 2	δ : Assuming $J^\pi=11/2^-$.
2439.5	14	16 5	3414.2	3/2 ⁻	974.8	3/2 ⁺	E1(+M2)	<0.2 ^b	
2450.5	10	46 4	4058.9	9/2 ⁺	1611.8	7/2 ⁺	M1+E2	-0.46 ^b 10	
2515.7	12	14 6	5251.3	11/2 ⁺	2738.2	7/2 ⁺			
2552		19 3	5116.3	1/2 ⁻	2564.1	1/2 ⁺			
2564.0	6	3 1	2564.1	1/2 ⁺	0	5/2 ⁺			
2636.4	‡ 3	75 @ 8	6041.3	11/2 ⁺ ,7/2 ⁺	3404.9	9/2 ⁺	M1+E2	-0.16 3	δ : Assuming $J^\pi=11/2^+$. For JPI=7/2 ⁺ δ =+0.32 8 (1975Bu14), δ =+027 1 (1974Ro10).
2719.8	‡ 3	19 4	5520.7	5/2 ⁻	2801.1	3/2 ⁺	E1(+M2)	+0.05 6	
2738.0	6	6 1	2738.2	7/2 ⁺	0	5/2 ⁺	M1+E2	-2.9 ^b 5	δ : Inconsistent with BE2(†) from (e,e').
2746.9	‡ 5	94 2	4711.5	9/2 ⁺	1964.6	5/2 ⁺	E2(+M3)	0.00 4	
2800.9	‡ 2	19 2	2801.1	3/2 ⁺	0	5/2 ⁺	M1+E2	-0.5 +4-16	δ : Other value: -2.0< δ <0.25 (1972Ke13).
2828.9	14	76 3	3414.2	3/2 ⁻	585.1	1/2 ⁺	E1(+M2)		δ : -0.18< δ <+0.12 (1972Ke13).
2933.5	16	70 5	3908.3	5/2 ⁺	974.8	3/2 ⁺	M1+E2		δ : -0.07< δ <+0.03 (1972Ke13).
3047.6	‡ 3	42 4	5012.2	7/2 ⁺	1964.6	5/2 ⁺	M1(+E2)	0.00 ^a 5	
3056		31 @ 15	5859	5/2 ⁺	2801.1	3/2 ⁺			
3238.7	‡ 10	38 6	5977.0	7/2 ⁺	2738.2	7/2 ⁺	M1(+E2)	0.00 9	
3302.2	‡ 2	75 4	4277.0	1/2,3/2	974.8	3/2 ⁺			
3384.6	‡ 2	50 4	4359.4	3/2 ⁺	974.8	3/2 ⁺	M1+E2	+0.09 7	δ : Other value: δ >-0.2 (1972Ke13).
3400.6	11	14 4	5012.2	7/2 ⁺	1611.8	7/2 ⁺			
3404.7	4	21 2	3404.9	9/2 ⁺	0	5/2 ⁺			

Continued on next page (footnotes at end of table)

$^{22}\text{Ne}(\alpha, n\gamma)$ **1976Ch29, 1975Bu14, 1974Ro10** (continued) $\gamma(^{25}\text{Mg})$ (continued)

E_γ †	I_γ #	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	δ &	Comments
3413.9 13	8 2	3414.2	3/2 ⁻	0	5/2 ⁺	E1(+M2)	<0.2 ^b	
3556.1 ‡ 6	20 5	5520.7	5/2 ⁻	1964.6	5/2 ⁺	E1(+M2)	0.00 10	δ : Other value: -0.05 2 (1974Ko10).
3639.5 ‡ 3	44 8	5251.3	11/2 ⁺	1611.8	7/2 ⁺	M1+E2	+1.00 10	δ : Other value: +1.00 15 (1974Ko10).
3692.1 15	10 3	4277.0	1/2,3/2	585.1	1/2 ⁺			
3748.7 22	100	4723.6	1/2,3/2,5/2	974.8	3/2 ⁺	M1+E2	-0.25 ^b 15	
3774.3 ‡ 2	49 4	4359.4	3/2 ⁺	585.1	1/2 ⁺	M1+E2	-0.19 9	δ : Other value: δ <-0.05 (1972Ke13).
3908.0 15	8 4	3908.3	5/2 ⁺	0	5/2 ⁺	M1+E2	<-0.8 ^b	
3909	30 5	5520.7	5/2 ⁻	1611.8	7/2 ⁺	E1+M2	+0.15 ^a 5	
3922.0 11	38 4	5533.4	11/2 ⁺	1611.8	7/2 ⁺			
3971.3 7	77 2	3970.6	7/2 ⁻	0	5/2 ⁺	E1+M2	-0.02 ^b 3	
4012.4 ‡ 10	62 6	5977.0	7/2 ⁺	1964.6	5/2 ⁺	M1+E2	-0.14 3	δ : Other value: -0.03 3 (1974Ko10).
4058.9 ‡ 5	54 4	4058.9	9/2 ⁺	0	5/2 ⁺	E2(+M3)	-0.02 2	
4141.5 ‡ 10	73 4	5116.3	1/2 ⁻	974.8	3/2 ⁺			
4359.1 ‡ 5	50 7	5970.9	9/2 ⁺	1611.8	7/2 ⁺	M1+E2	-0.31 4	δ : Other value: -0.31 6 (1974Ko10).
4499	33 2	5474	1/2 ⁺	974.8	3/2 ⁺			
4530	5 2	5116.3	1/2 ⁻	585.1	1/2 ⁺			
4772	62 7	5747	5/2 ⁽⁺⁾	974.8	3/2 ⁺			
4884	19 @ 10	5859	5/2 ⁺	974.8	3/2 ⁺			
4888	64 7	5474	1/2 ⁺	585.1	1/2 ⁺			
5012.1 10	24 4	5012.2	7/2 ⁺	0	5/2 ⁺	M1+E2	+0.27 ^a 3	
5520	14 5	5520.7	5/2 ⁻	0	5/2 ⁺	E1+M2	+0.07 ^a 1	
5746	38 7	5747	5/2 ⁽⁺⁾	0	5/2 ⁺	M1+E2	-0.40 ^a 11	
5858	50 @ 20	5859	5/2 ⁺	0	5/2 ⁺	M1+E2	>0.14 ^a	δ : Also <0.75.

† From level energy differences corrected for recoil except as noted.

‡ From 1975Bu14.

From 1976Ch29 except as noted.

@ From 1974Ro10.

& From 1975Bu14 except as noted.

^a From 1974Ro10.

^b From 1972Ke13.

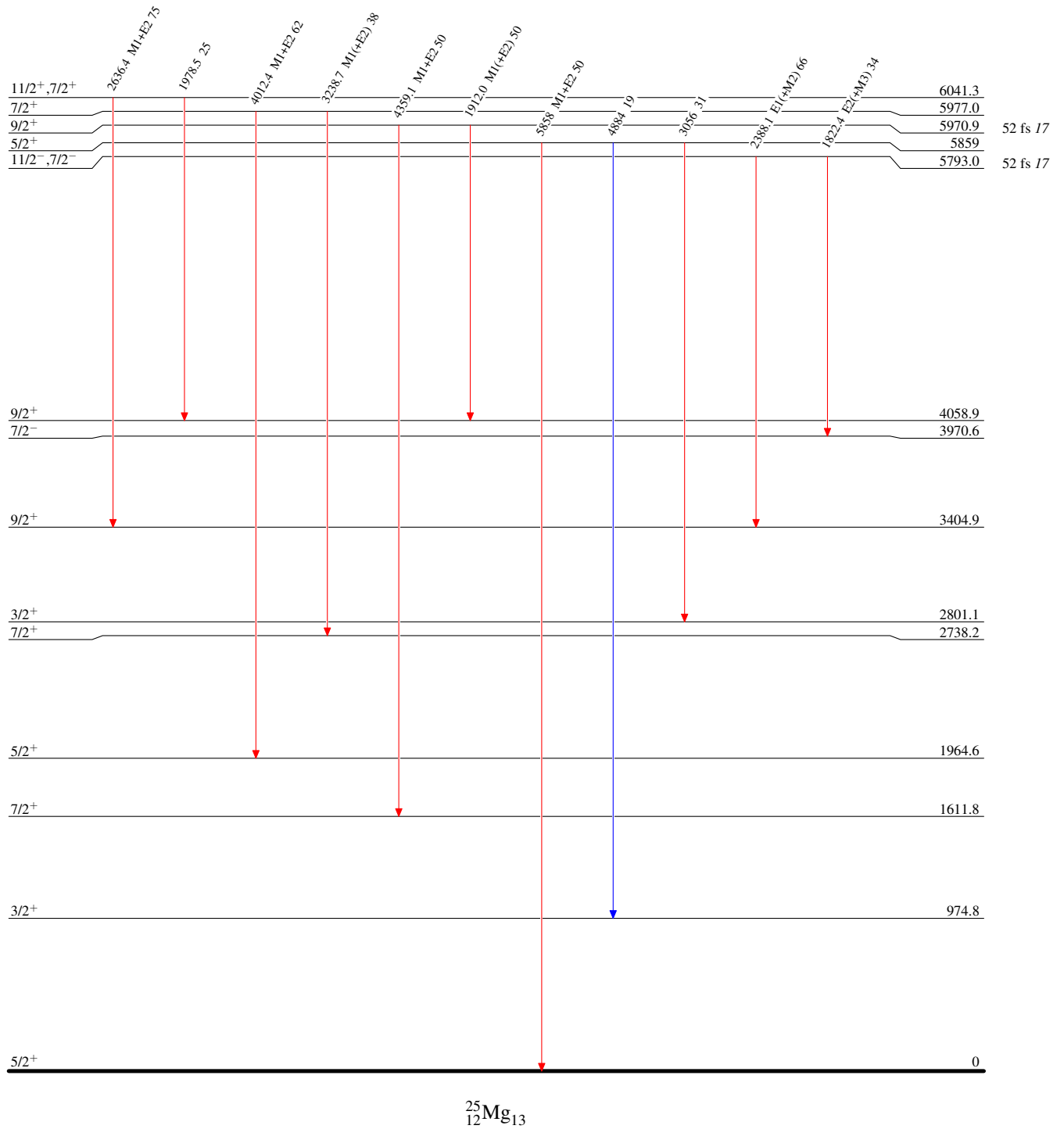
$^{22}\text{Ne}(\alpha, n\gamma)$ 1976Ch29, 1975Bu14, 1974Ro10

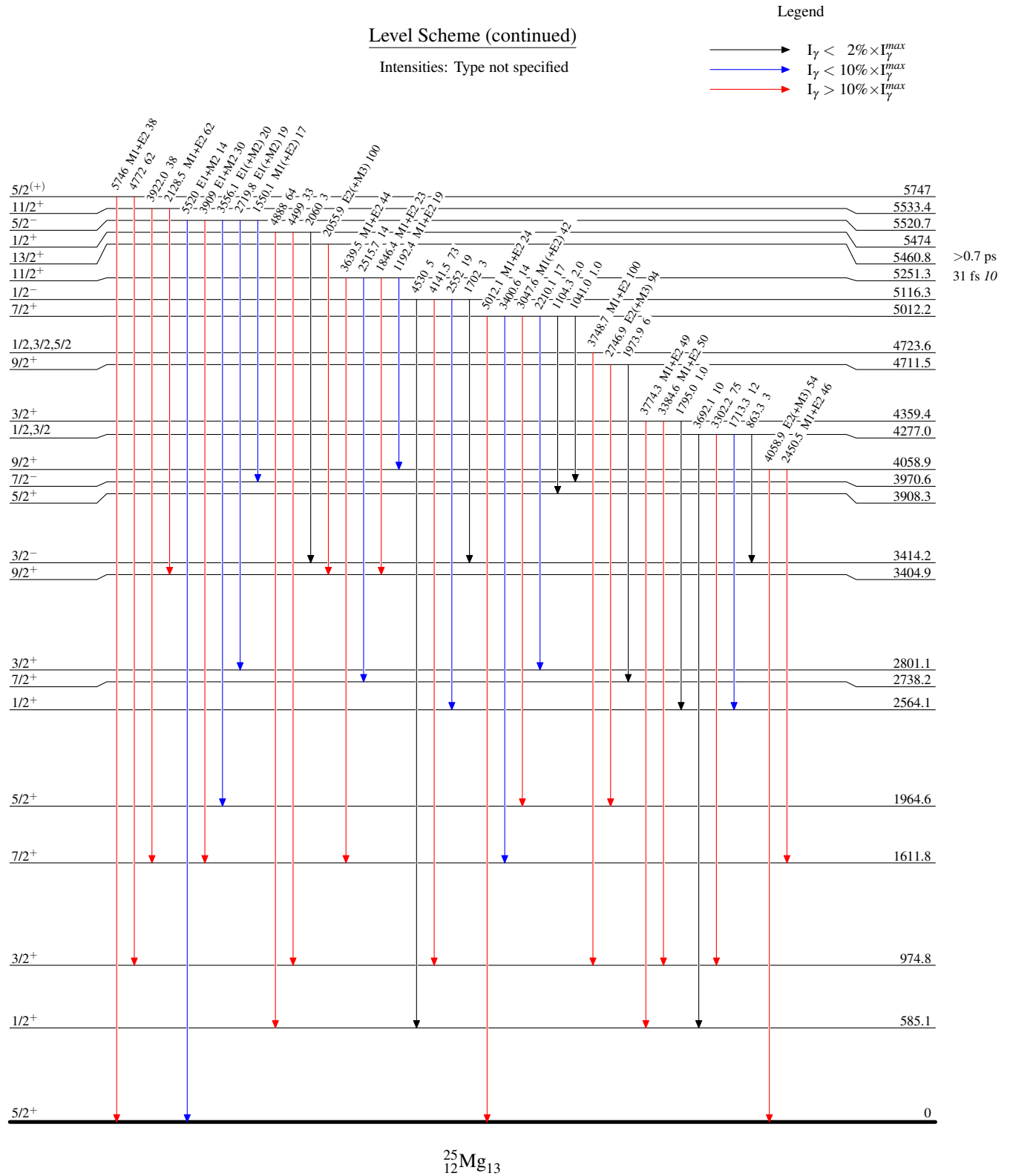
Level Scheme

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$



$^{22}\text{Ne}(\alpha, n\gamma)$ 1976Ch29, 1975Bu14, 1974Ro10

²²Ne(α,nγ) ¹⁹⁷⁶Ch29,¹⁹⁷⁵Bu14,¹⁹⁷⁴Ro10

Level Scheme (continued)

Intensities: Type not specified

Legend

- ▬ I_γ < 2% × I_{γmax}
- ▬ I_γ < 10% × I_{γmax}
- ▬ I_γ > 10% × I_{γmax}

