

¹⁸O(α ,n γ) 1971Ba81,1972Ro17,1989Ho07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	R. B. Firestone	NDS 127, 1 (2015)	15-Jan-2015

1971Ba81: ¹⁸O(α ,n γ) E=5.0,6.5,7.5,9.0 MeV. Measured Doppler-shift attenuation, E γ , I γ . Deduced levels, T_{1/2}.
 1972Ro17: ¹⁸O(α ,n γ), E=4.9-11.5 MeV. Measured E γ , $\gamma\gamma$, n γ -coin, DSA. Enriched target.
 1989Ho07: ¹⁸O(α ,n γ), E=12,13,14.5, and 15.4 MeV. Measured n γ (θ), n γ -coin.
 Other: 1969Pr10: ¹⁸O(α ,n), E=2.9-6.9 MeV. 1975Ha38: ¹⁸O(α ,n), E=1-5 MeV.

²¹Ne Levels

E(level) [†]	J π [‡]	T _{1/2}	Comments
0			
350.6 1		2.5 ps 4	T _{1/2} : From 1971Ba81.
1746.1 2		53 fs 8	T _{1/2} : From 1969Pr10. Other value: 17 fs 5 (1971Ba81).
2789.6 3		>5 ps	T _{1/2} : From 1971Ba81.
2796.4 10		<24 fs	
2866.6 2		39 fs 10	T _{1/2} : From 1969Pr10. Other value: 19 fs 4 (1971Ba81).
3663.5 4		45 fs 6	T _{1/2} : Weighted average of 47 fs 10 (1969Pr10) and 44 fs 8 (1971Ba81).
3735.2 2		<17 fs	T _{1/2} : From 1971Ba81.
3883.5 3		30 fs 9	T _{1/2} : From 1969Pr10. Other value: 17 fs 14 (1971Ba81).
4433.8 10		22 fs 4	T _{1/2} : Weighted average of 24 fs 4 (1972Ro17), 30 fs 9 (1969Pr10), and 17 fs 5 (1971Ba81).
4525.5 5		<7 fs	T _{1/2} : From 1971Ba81.
4685.0 7		<7 fs	T _{1/2} : From 1971Ba81.
4726.9 10		<7 fs	T _{1/2} : From 1971Ba81.
5334.7 10		<7 fs	
5431.3 10	(5/2 ⁺ , 7/2)	<14 fs	T _{1/2} : From 1971Ba81.
5525.0? 15		69 fs 21	E(level), T _{1/2} : From 1972Ro17.
5550 2		28 fs 9	E(level), T _{1/2} : From 1972Ro17.
5630.2 10		<7 fs	E(level): From 1972Ro17.
5685.3? 10		<7 fs	T _{1/2} : From 1971Ba81.
5773 2		28 fs 9	
5819 2		<24 fs	
5822 2		55 fs 12	
5993.9 18		<7 fs	E(level): From 1972Ro17.
6032.8 5		24 fs 21	T _{1/2} : From 1972Ro17.
6175 2		24 fs 12	
6266.7 16		24 fs 12	E(level), T _{1/2} : From 1972Ro17.
6448.5 15		<14 fs	T _{1/2} : From 1971Ba81.
6554.3 12		31 fs 21	E(level): From 1972Ro17. T _{1/2} : From 1971Ba81.
6606.6 18		<7 fs	E(level): From 1972Ro17.
6639 2			
6737 2			
7006 1			
7041 1	9/2		
7109 4			
7154 5			
7226 5			
7320 5			
7356 2			
7422 1			
7600 5			
7648 2	7/2 ⁺		
7981 1	7/2 ⁺ , 11/2 ⁺		
8154 1	9/2 ⁺		
8240 1	11/2 ⁺		

Continued on next page (footnotes at end of table)

$^{18}\text{O}(\alpha, n\gamma)$ **1971Ba81, 1972Ro17, 1989Ho07** (continued) ^{21}Ne Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2}	Comments
8526 3		6 keV	
8585 10		45 keV	
8664 1			
8687 10		60 keV	
8784 5		50 keV	
8801 3		<5 keV	
8849 5		10 keV	
8858 3		2.8 keV 5	T _{1/2} : From 1976Mc12 .
8930 5		5 keV	
8991 5		2.5 keV	
9401 1	13/2 ⁻		
9857 1			
9941 1			

[†] From [1971Ba81](#) γ -ray measurements, increased by 0.04% to correspond with other work [1990En08](#). E γ not given.

[‡] From analysis of penetrabilities for neutron decay of unbound levels.

 $\gamma(^{21}\text{Ne})$

E γ [†]	I γ [‡]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [#]	δ	Comments
350.6 1		350.6		0				
698.1 6	18 4	6032.8		5334.7				
866.9 4	4 2	3663.5		2796.4				
873.1 5	35 2	3663.5		2789.6				
958.4 10	13 3	5685.3?		4726.9				
1024 2	14 2	5550		4525.5				
1090 2	11 1	6639		5550				
1119.9 2	100 3	2866.6		1746.1				I γ : From 1971Ba81 .
1294 2	5 2	5819		4525.5				
1451.2 10	7 3	5334.7		3883.5				
1567.2 10	55 5	4433.8		2866.6		M1+E2	-0.10 3	
1610 1	7 1	7041	9/2	5431.3	(5/2 ⁺ , 7/2)			
1815 2	25 3	5550		3735.2				
1833.2 16	4 2	6266.7		4433.8				
1895.0 10	10 4	5630.2		3735.2				
1934 2	32 4	5819		3883.5		M1+E2	+0.09 +5-3	
1979 1	24 3	9401	13/2 ⁻	7422				
2015 3	80 10	6448.5		4433.8				
2082 2	12 3	5819		3735.2		E1(+M2)	-0.04 4	
2087 1	4 3	7422		5334.7				
2121 1	8 4	8154	9/2 ⁺	6032.8				
2122.5 12	11 3	6554.3		4433.8				
2149.3 6	14 2	6032.8		3883.5				
2154 2	4 2	5819		3663.5				
2208 2	15 1	6639		4433.8				
2438 2	16 5	6175		3735.2		M1+E2	-1.6 +15-6	δ : Assuming J=5/2. For J=7/2, δ =+0.17 +5-8.
2467.6 10	16 3	5334.7		2866.6				
2516.0 2	69 3	2866.6		350.6				I γ : From 1971Ba81 .
2564.7 10	16 8	5431.3	(5/2 ⁺ , 7/2)	2866.6				
2631 1	100	8664		6032.8				
2687.7 10	45 5	4433.8		1746.1				
2754 2	16 5	5550		2796.4				

Continued on next page (footnotes at end of table)

$^{18}\text{O}(\alpha, n\gamma)$ **1971Ba81, 1972Ro17, 1989Ho07** (continued) $\gamma(^{21}\text{Ne})$ (continued)

E_γ^\dagger	I_γ^\ddagger	$E_i(\text{level})$	J_i^\ddagger	E_f	Mult.#	δ	Comments
2760 2	18 5	5550		2789.6			
2796.4 10		2796.4		0			
2895.7 10	53 5	5685.3?		2789.6			
2953 2	24 2	5819		2866.6	E1(+M2)	+0.02 3	
3025 2	48 5	5822		2796.4			
3166.2 6	38 2	6032.8		2866.6	E1(+M2)	-0.08 13	
3271 1	3 1	7006		3735.2			
3312.9 4	61 3	3663.5		350.6			
3368 1	65 5	9401	13/2 ⁻	6032.8	E2		δ : Assuming J=13/2. For J=9/2, $\delta=-1.0$ 5.
3384.6 2	11 2	3735.2		350.6	M1+E2	-0.55 10	
3400.1 16	76 8	6266.7		2866.6	M1+E2	+0.02 +5-8	
3411 1	44 4	9857		6448.5			
3495 1	100	9941		6448.5			
3532.9 3	78 2	3883.5		350.6	E1(+M2)	+0.07 4	
3550 1	25 3	7981	7/2 ⁺ , 11/2 ⁺	4433.8			
3581.9 15	20 10	6448.5		2866.6			
3685.2 10	26 4	5431.3	(5/2 ⁺ , 7/2)	1746.1			
3687.6 12	24 4	6554.3		2866.6			
3735.2 2	89 2	3735.2		0	M1+E2	-0.15 2	
3773 2	45 2	6639		2866.6	D+Q	+0.09 15	δ : Assuming J=7/2. For J=9/2, $\delta=+0.09$ 15.
3809 1	48 4	8240	11/2 ⁺	4433.8	D+Q	-1.2 2	δ : Assuming J=11/2. For J=9/2, $\delta=-0.04$ 3.
3825 1	56 4	9857		6032.8			
3883.5 3	22 2	3883.5		0	E1(+M2)	+0.03 3	
3884.1 10	14 5	5630.2		1746.1			
4073 2	5 2	5819		1746.1			
4139 1	6 3	7006		2866.6			
4174 1	24 2	7041	9/2	2866.6	E2		δ : Assuming J=5/2. For J=9/2, M1+E2 $\delta=+0.27$ 8.
4174.9 5	85 2	4525.5		350.6			
4286.7 6	46 2	6032.8		1746.1	E1+M2	-0.08 +5-4	
4334.4 7	100 4	4685.0		350.6			
4429 2	44 5	6175		1746.1	M1+E2	-0.09 +5-4	δ : Assuming J=5/2. For J=7/2, $\delta=-0.18$ +12-4.
4490 2	35 5	7356		2866.6	D+Q	+0.02 7	δ : Assuming J=7/2. For J=9/2, $\delta=-0.84$ +69-41.
4520.6 16	5 3	6266.7		1746.1			
4525.5 5	15 2	4525.5		0			I_γ : From 1971Ba81.
4556 1	96 3	7422		2866.6	D+Q	+0.12 +3-2	δ : Assuming J=7/2. For J=11/2, $\delta=+0.01$ 1.
4685.0 7	56 4	4685.0		0			I_γ : From 1971Ba81.
4782 2	9 5	7648	7/2 ⁺	2866.6			
4808.2 12	65 6	6554.3		1746.1	D+Q	+0.0 2	
4893 2	29 2	6639		1746.1	D+Q	-1.1 +46-5	δ : Assuming J=7/2. For J=9/2, $\delta=+0.03$ 6.
4970 1	11 3	9401	13/2 ⁻	4433.8			
4984.1 10	77 5	5334.7		350.6			
5080.7 10	58 4	5431.3	(5/2 ⁺ , 7/2)	350.6	M1+E2		δ : $\delta=+0.84$ +40-24 for J=5/2, $\delta=0.00$ 45 For J=7/2.
5115 1	66 2	7981	7/2 ⁺ , 11/2 ⁺	2866.6	M1+E2		δ : $\delta=-0.19$ 4 for J=7/2, $\delta=+0.07$ 3 for J=11/2.
5199 2	6 3	5550		350.6			
5260 1	53 4	7006		1746.1	M1+E2	-0.35 +4-7	
5279.6 10	70 5	5630.2		350.6			
5288 1	26 6	8154	9/2 ⁺	2866.6			
5295 1	64 3	7041	9/2	1746.1	M1+E2	+0.27 6	δ : Assuming J=5/2. For J=9/2, $\delta=+0.11$ 4.
5374 1	52 4	8240	11/2 ⁺	2866.6	D+Q	0.52 10	δ : Assuming J=11/2. For J=9/2, $\delta=-0.02$ +8-3.
5422 2	15 10	5773		350.6			
5468 2	17 2	5819		350.6			
5471 2	52 5	5822		350.6			
5550 2	21 3	5550		0	M1+E2	-0.27 3	
5610 2	65 5	7356		1746.1	D+Q	-0.07 7	δ : Assuming J=7/2. For J=9/2, $\delta=-0.40$ +6-10.
5630.2 10	6 4	5630.2		0			

Continued on next page (footnotes at end of table)

$^{18}\text{O}(\alpha, n\gamma)$ [1971Ba81](#), [1972Ro17](#), [1989Ho07](#) (continued) $\gamma(^{21}\text{Ne})$ (continued)

E_γ^\dagger	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	Mult. #	δ	Comments
5685.3 10	34 6	5685.3?		0			
5773 2	85 10	5773		0			
5824 2	35 5	6175		350.6			
5902 2	44 6	7648	7/2 ⁺	1746.1			
5916.1 16	15 5	6266.7		350.6			
5993.9 18	100	5993.9		0			
6175 2	5 3	6175		0			
6235 1	9 2	7981	7/2 ⁺ , 11/2 ⁺	1746.1			
6256.0 18	95 5	6606.6		350.6	M1+E2	+0.8 +6-4	δ : Assuming J=3/2. For J=5/2, $\delta=-0.03$ 10.
6386 2	22 3	6737		350.6			
6408 1	66 6	8154	9/2 ⁺	1746.1	D+Q	+0.21 5	δ : Assuming J=5/2. For J=9/2, $\delta=+0.05$ 4.
6606.6 18	5 5	6606.6		0			
6655 1	31 4	7006		350.6	M1+E2	-0.21 4	
6690 1	5 3	7041	9/2	350.6			
6737 2	78 3	6737		0			
7006 1	7 2	7006		0			
7297 2	26 7	7648	7/2 ⁺	350.6			
7648 2	21 6	7648	7/2 ⁺	0			

[†] Deduced from level energies.

[‡] From [1969Pr10](#) for E<5 Mev, from [1989Ho07](#) for E>5 MeV.

D+Q parity assumed from adopted J^π .

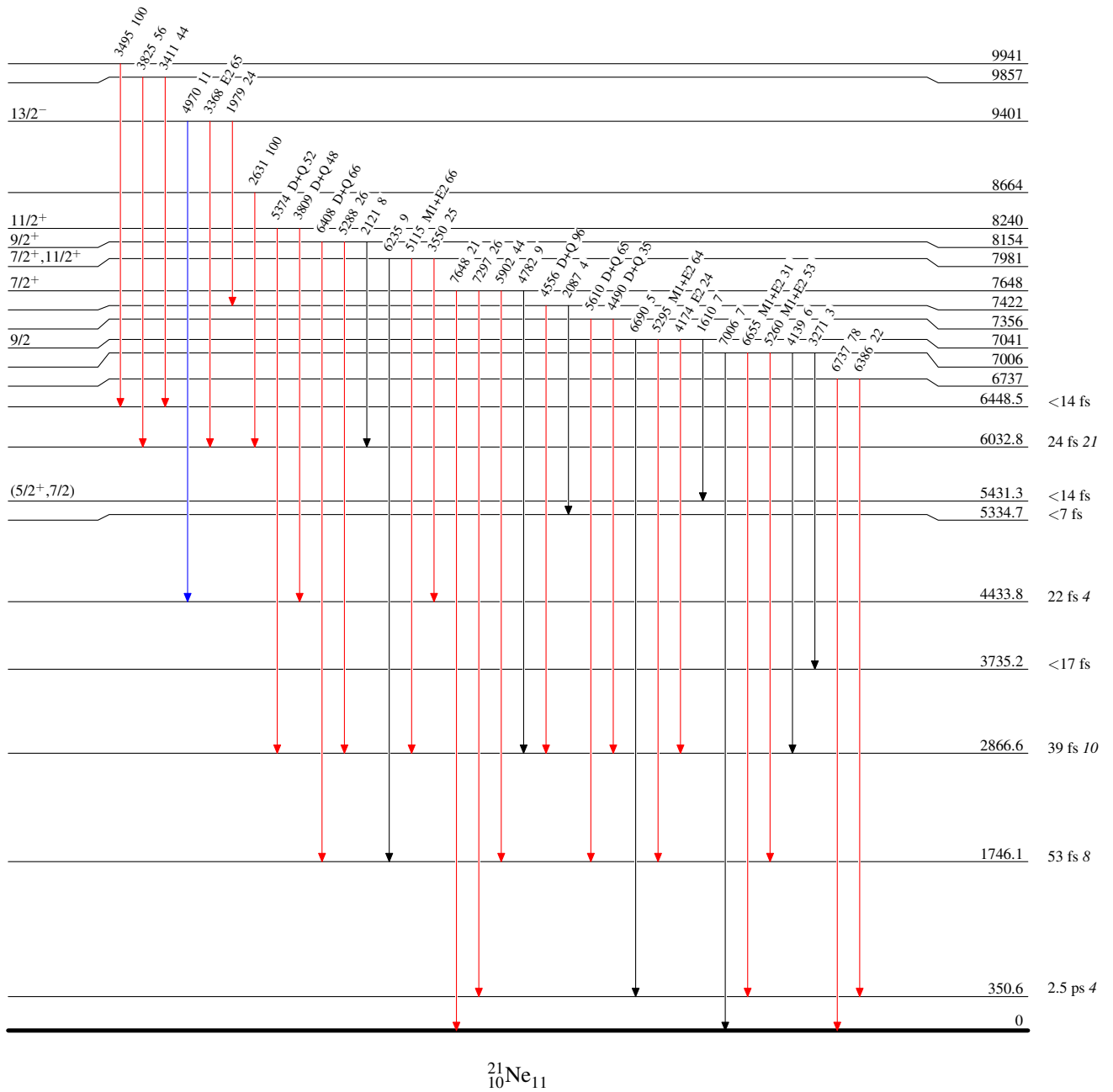
$^{18}\text{O}(\alpha, n\gamma)$ 1971Ba81, 1972Ro17, 1989Ho07

Level Scheme

Intensities: Type not specified

Legend

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

 $^{21}_{10}\text{Ne}_{11}$

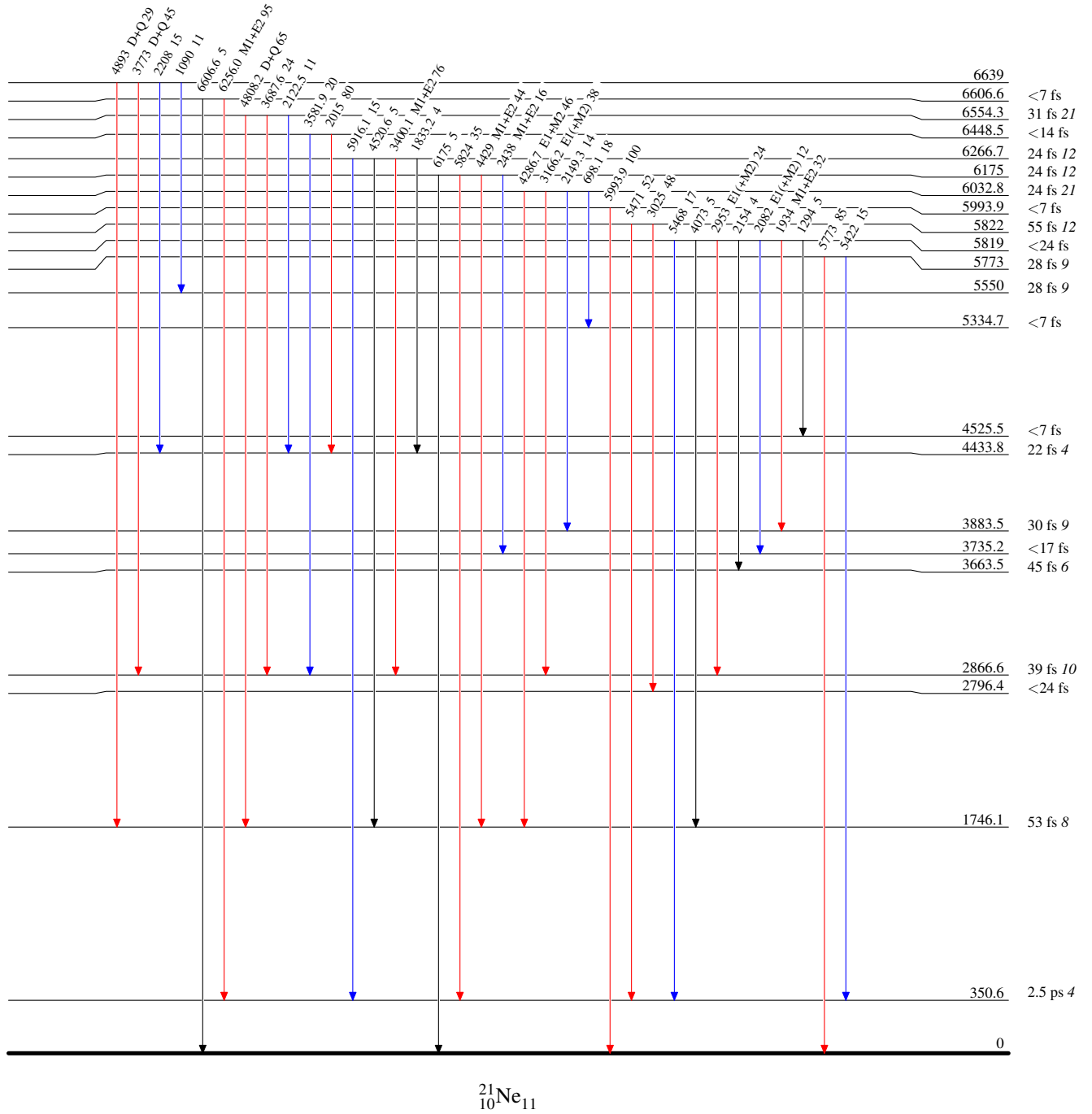
$^{18}\text{O}(\alpha, n\gamma)$ 1971Ba81, 1972Ro17, 1989Ho07

Level Scheme (continued)

Intensities: Type not specified

Legend

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



$^{21}_{10}\text{Ne}_{11}$

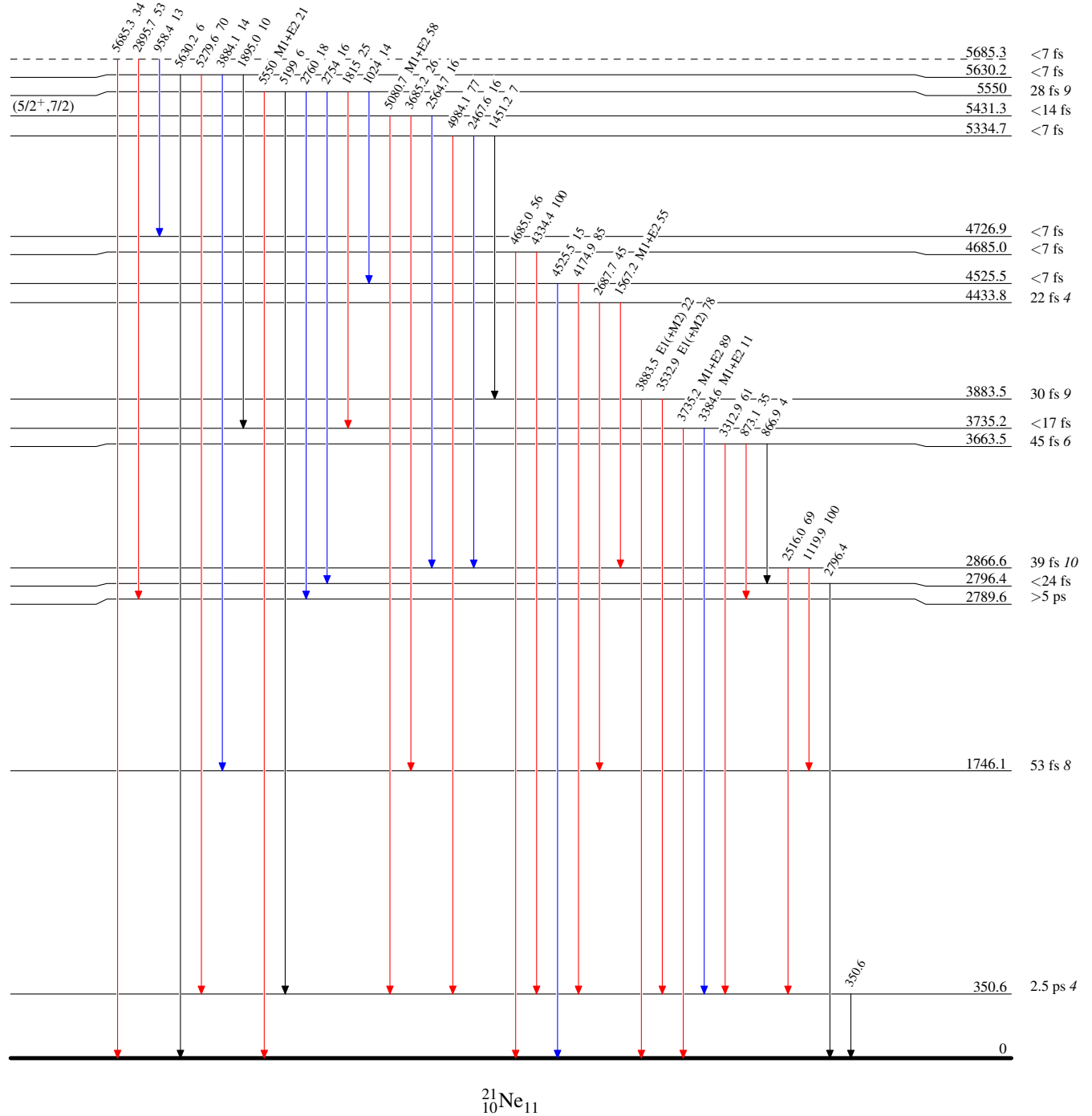
$^{18}\text{O}(\alpha, n\gamma)$ 1971Ba81, 1972Ro17, 1989Ho07

Level Scheme (continued)

Intensities: Type not specified

Legend

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

 $^{21}_{10}\text{Ne}_{11}$