

$^{45}\text{Sc}(\alpha, p\gamma)$ 1979GI07, 1978Li13

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 179, 1 (2022)	30-Nov-2021

1979GI07: E=11, 12, and 13 MeV α beams were produced from the 7-MV Van de Graaff accelerator of the University of Freiburg.

Target was 100 $\mu\text{g}/\text{cm}^2$ self-supporting ^{45}Sc foil. γ rays were detected with two 120 cm^3 Ge(Li) detector and protons were detected with an annular surface-barrier Si detector. Measured E_γ , I_γ , $\gamma\gamma$ -coin, $p\gamma$ -coin, $p\gamma(\theta)$, Doppler-shift attenuation.

Deduced levels, J, π , $T_{1/2}$, γ -ray branching ratios, multipolarities, mixing ratios, transition strengths. Comparisons with shell-model calculations. See also **1978GI05**. Report levels up to 8323.

1978Li13: E=9.6 MeV α beam was produced from the University of Melbourne 5U Pelletron accelerator. Targets were 36 $\mu\text{g}/\text{cm}^2$ 3 metallic Sc on thick Ta backings. γ rays were detected with Ge(Li) detectors at 26° and 154° and protons were detected with annular Si detectors at 135° to 169° . Measured E_γ , I_γ , $\gamma\gamma$ -coin, $p\gamma$ -coin, Doppler-shift attenuation. Deduced levels, J, π , $T_{1/2}$, γ -ray branching ratios, multipolarities, mixing ratios, transition strengths. Comparisons with available data and theoretical calculations. See also **1977BoYN** for report of $T_{1/2}$ from the same experiment. Report levels up to 4073. A 10% uncertainty in stopping theory is assumed.

1974Br04: E=10 MeV. Measured E_γ , recoil distance at 0° . Deduced $T_{1/2}$ for 3332 and 3508 levels.

 ^{48}Ti Levels

E(level) [†]	J π [‡]	$T_{1/2}$ [#]	Comments
0.0	0 ⁺		
983.5 5	2 ⁺	>3.5 ps	$T_{1/2}$: other: 1978Li13 report 2.3 ps +2I-7 from DSAM, which however is not adopted by the authors as too close to the limit of applicability of DSAM method.
2295 1	4 ⁺	0.97 ps 35	$T_{1/2}$: other: 0.44 ps +7-4 (1978Li13) is discrepant.
2421 1	2 ⁺	32 fs 6	$T_{1/2}$: weighted average of 42 fs 14 (1979GI07) and 30 fs 6 (1978Li13).
2999 1	0 ⁺		
3224 1	3 ⁺	41 fs 6	$T_{1/2}$: weighted average 54 fs 17 (1979GI07) and 39 fs 6 (1978Li13).
3239 1	4 ⁺	49 fs 14	$T_{1/2}$: other: 16 fs +9-6 (1978Li13).
3332 1	6 ⁺ @	8.9 ps 8	$T_{1/2}$: from RDM in 1974Br04 . Others: >3.5 ps (1979GI07), >1.3 ps (1978Li13).
3359 1	3 ⁻	198 fs +80-70	$T_{1/2}$: other: 44 fs 6 (1978Li13) is discrepant.
3373 1	2 ⁺	<28 fs	$T_{1/2}$: other: <8 fs (1978Li13).
3508 1	6 ⁺ @	1.9 ps 5	$T_{1/2}$: deduced by the evaluator from 1.4 ps < $T_{1/2}$ <2.4 ps, with lower limit from DSAM in 1979GI07 and upper limit from RDM in 1974Br04 . Other: 0.9 ps +5-3 from DSAM in 1978Li13 , but it is inconsistent with $T_{1/2}$ >1 ps from RUL of 176 γ assuming Mult(176 γ)=M1.
3618 1	2 ⁺	38 fs 13	$T_{1/2}$: other: <8 fs (1978Li13).
3703 2	1 ⁻		
3711 5			
3741 2	1 ⁺	<1.4 fs	$T_{1/2}$: from 1978Li13 .
3783 1	3 ⁻ , 4 ⁻	1.2 ps +11-6	$T_{1/2}$: other: >6.9 ps (1978Li13).
3853 1	3 ⁻	30 fs 8	$T_{1/2}$: weighted average of 48 fs 14 (1979GI07) and 27 fs 6 (1978Li13).
4036 1	2 ⁺	22 fs 13	$T_{1/2}$: weighted average of 42 fs 17 (1979GI07) and 14 ps 11 (1978Li13).
4046 1	5 ⁽⁻⁾ @	0.37 ps 11	$T_{1/2}$: other: 0.022 ps 3 (1978Li13) is discrepant.
4074 2	2 ⁺	35 fs 11	$T_{1/2}$: other: 10 fs 4 (1978Li13) is discrepant.
4199 2	(2 ⁺)		
4258 2	1 ⁺		
4312 1	1 ⁺		
4348 2	(2 ⁺)		
4381 2	(3,4,5 ⁻)	21 fs 14	
4389 2	4 ⁺	35 fs 14	
4398 1	6 ⁺ @	45 fs 14	
4404 2	5 ⁽⁺⁾ @	<42 fs	
4458 1	3 ⁺	49 fs 24	
4564 1	8 ⁽⁺⁾ @	>3.5 ps	
4583 1	3 ⁻	28 fs 14	

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979Gl07, 1978Li13** (continued) ^{48}Ti Levels (continued)

E(level) [†]	J $\pi^{\ddagger}$	T _{1/2} [#]	E(level) [†]	J $\pi^{\ddagger}$	T _{1/2} [#]
4719 1	4 ⁺	66 fs 24	6119 2	(4 ⁺ , 5)	
4794 2	(1 ⁻ , 2, 3 ⁻)	28 fs 14	6126 5	1	
4795 2	(3 ⁻ , 4)	70 fs 35	6147 4	(4 ⁺ to 8 ⁺)	
4861 1	2 ⁺ , 3 ⁺ , 4 ⁺	21 fs 11	6153 2	(4 ⁺ to 7 ⁻)	
4885 1	(2 ⁺ , 3 ⁺ , 4 ⁺)		6172 1	8 ⁺ , 6 ⁺ @	35 fs 28
4912 2	(1 ⁺ , 2 ⁺)		6176 3	(2 ⁺ , 3, 4, 5 ⁻)	
4916 1	5 ⁻	0.19 ps 11	6183 3	(2 ⁺ to 6 ⁺)	
4925 2	(2, 3, 4) ⁺	21 fs 11	6223 5	(0 ⁺ to 4 ⁺)	
4940 1	(2, 3, 4) ⁺		6234 3	3 ⁻	
4956 1	(4 ⁺ , 5, 6 ⁻)	>1.0 ps	6246 3	(0 ⁺ to 3 ⁺)	
4972 2	0 ⁺		6254 3	3 ⁻	
4992 2	5 ⁻		6268 5	(3 ⁻)	
5147 2	4 ⁺	50 fs 28	6316 2	(2 ⁺ , 3, 4 ⁺)	
5155 2	5 ⁽⁺⁾ @	<7 fs	6322 2	(2, 3, 4)	
5158 2	4 ⁺	<25 fs	6331 4	(1 ⁺ to 5 ⁺)	
5169 1	7 ⁺ @	28 fs 12	6337 4	3 ⁻	
5197 1	8 ⁺ @	76 fs 24	6363 3	(3, 4) ⁺	
5252 1	(2 ⁺ , 3, 4, 5 ⁻)	49 fs +20-24	6394 3	(6 ⁺ , 7 ⁻)	
5274 2	(1 ⁻ , 2)		6400 2	(4 ⁺ to 8 ⁺)	
5300 1	(4 ⁺ , 5, 6)	<35 fs	6414 4	(2 ⁺ to 6 ⁺)	
5312 1	(5 ⁻) @	69 fs 28	6434 4	(3 ⁻ to 7 ⁻)	
5313 2	2 ⁺		6451 3	(2 ⁺ , 3, 4)	
5357 2	(2 ⁺ , 3, 4 ⁺)		6460 3	(4 ⁺ to 8 ⁺)	
5383 2	(3) ⁻		6476 3	3 ⁻	
5491 3	2 ⁺		6491 5	(0 ⁺ to 4 ⁺)	
5500 2	4 ⁺	26 fs 12	6493 3	(4 ⁺ , 5, 6, 7 ⁻)	
5522 2	3 ⁻		6507 3	(6 ⁺ , 7 ⁻)	
5545 2	(4 ⁺ to 8 ⁺)		6518 2	4 ⁺	
5546 2	3 ⁻		6524 3	(4 ⁺ to 8 ⁺)	
5569 2	2 ⁺		6530 3	(1 ⁻ to 6 ⁻)	
5616 1	(3) ⁻		6536 2	(4 ⁺ to 7 ⁻)	
5620 1	2 ⁺		6539 3		
5630 1	7 @	24 fs 14	6544 2	(2 ⁺ to 6 ⁺)	
5640 5	1 ⁺		6573 3	(5, 6, 7 ⁺)	
5642 2	3 ⁻	24 fs 11	6584 4	(3 ⁻)	
5762 3	(4 ⁺ , 5, 6 ⁺)		6605 5	1 ⁻	
5805 1	3 ⁻ , 4 ⁻	21 fs 12	6617 3	(4 ⁺ to 8 ⁺)	
5827 3	3 ⁻		6634 4	(3 ⁻ , 4, 5 ⁻)	
5846 2	3 ⁻	<21 fs	6653 4	(1 ⁻ to 6 ⁻)	
5886 2	(4 ⁺ to 8 ⁺)		6661 4	(3 ⁻ to 7 ⁻)	
5892 3	(1 ⁻ , 2 ⁺)		6673 4	(2, 3, 4) ⁺	
5917 3	2 ⁺		6707 2	(2 ⁺ , 3, 4 ⁺)	
5974 2	(4 ⁺ , 5, 6)		6711 2	(4 ⁺ , 5, 6, 7 ⁻)	
5990 1	(4 ⁺ , 5, 6 ⁺)		6744 1	(4 ⁺ , 5, 6 ⁺)	
5993 2	(2) ⁺		6757 2	(6 ⁺ , 7, 8, 9)	
6034 1	9 ⁺ , 7 ⁺ @ &	<21 fs	6770 2	(4 ⁺ to 8 ⁺)	
6036 2	4 ⁺		6808 3		
6039 1	6 @	25 fs 17	6814 3	(3 ⁻)	
6040 5	(1, 2)		6825 2	(4 ⁺ to 8 ⁺)	
6044 2	(2, 3)		6831 4	(0 ⁺ to 4 ⁺)	
6051 3			6841 4	3 ⁻	
6057 5	(0 ⁺ to 4 ⁺)		6869 3	(1 ⁻ to 5 ⁻)	
6084 3	(4 ⁺ , 5, 6 ⁻)		6878 4	(0 ⁺ to 4 ⁺)	
6102 1	10 ⁽⁺⁾ , 8 @ &	>1.4 ps	6880 2	(6 ⁺ , 7 ⁻)	125 fs +69-56

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979GI07, 1978Li13 (continued)** ^{48}Ti Levels (continued)

$E(\text{level})^\dagger$	$J^\pi^\ddagger$	$T_{1/2}^\#$	$E(\text{level})^\dagger$	$J^\pi^\ddagger$	$T_{1/2}^\#$
6885 2	(4 ⁺ to 8 ⁺)	97 fs +76-63	7274 2	(4 ⁺)	>0.7 ps
6906 2	10,8,6 @ &		7289 5	3 ⁺	
6916 3	(3 ⁻ to 7 ⁻)		7322 5	3 ⁻	
6944 2	(4 ⁺ , 5, 6, 7 ⁻)		7326 2	(6 ⁺ to 10 ⁺)	
6955 2	(5 ⁺ to 8 ⁺)		7344 4	(4 ⁺ to 8 ⁺)	
6966 3	(2 ⁺ to 6 ⁺)		7353 4	(5 to 9)	
6972 4	(0 ⁺ to 4 ⁺)		7374 3	11,9,7 @ &	
6975 3	(3 ⁻ to 7 ⁻)		7387 5		
6984 4	(1 ⁻ to 5 ⁻)		7427 3	9,7 @	
6985 3	(6 ⁺ , 7)		7431 5	(2,3,4) ⁺	
7033 4	(4 ⁺)		7442 3	(4 ⁺ , 5, 6 ⁺)	
7040 2	(6 ⁺ , 7, 8, 9 ⁺)		7476 3	(3 ⁺ to 7 ⁺)	
7054 3	(3 ⁻)		7483 5	(0 ⁺ to 4 ⁺)	
7069 4	(3 ⁻ , 4 ⁺)		7497 3	(4 ⁺)	
7075 2	(6 ⁺ to 10 ⁺)		7531 2	(6 ⁺ , 7, 8 ⁺)	
7093 3	(5 ⁺ to 8 ⁺)		7535 3		
7100 4	(2 ⁺ to 6 ⁺)		7556 4	(2 ⁺ to 6 ⁺)	
7111 3	(5 to 9)		7571 4	(4 ⁺ to 8 ⁺)	
7118 2	(6 ⁺ , 7 ⁻)		7587 3	(5, 6, 7, 8 ⁺)	
7149 3	(4 ⁺ to 8 ⁺)		7623 3	(6 ⁺ , 7 ⁻)	
7162 3	(4 ⁺ to 8 ⁺)		7656 4	(6 ⁺ to 10 ⁺)	
7183 5	(0 ⁺ to 4 ⁺)		7668 3	10,8 @ &	
7199 5	(0 to 4 ⁺)		7709 4	(3 ⁻ to 7 ⁻)	
7221 3	(1, 2, 3, 4 ⁺)		8091 3	12, 10, 8, 6 @ a	
7256 3	(4 ⁺)		8323 4	10, 8, 6 @	

[†] From 1979GI07 determined from their measured γ -ray energies that are not listed by the authors.

[‡] From Adopted Levels, unless otherwise noted. Arguments and assignments from this dataset are given in footnotes, where available.

[#] From DSAM in 1979GI07, unless otherwise noted. Some values from 1978Li13 are much lower than those in 1979GI07 and other studies and therefore they are not used and given under the comments.

@ Spin from $p\gamma(\theta)$ in 1979GI07.

& If J(8091)=12 then J(7374)=11, J(7668,6906,6102)=10, and J(7427,6034)=9.

a Excitation is consistent with prediction (1978Ku16) of a single 12⁺ state at ≈ 8 MeV.

 $\gamma(^{48}\text{Ti})$

A₂ and A₄ under comments are from 1979GI07.

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π
983.5	2 ⁺	983.1 3	100	0.0	0 ⁺
2295	4 ⁺	1311.7 3	100	983.5	2 ⁺
2421	2 ⁺	1436.9 5	99.0 2	983.5	2 ⁺
		2421	1.0 2	0.0	0 ⁺
2999	0 ⁺	2016	100	983.5	2 ⁺
3224	3 ⁺	803	4 1	2421	2 ⁺
		927.4 7	23 3	2295	4 ⁺
		2240.2 7	73 4	983.5	2 ⁺
3239	4 ⁺	943.6 5	100	2295	4 ⁺

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979Gl07, 1978Li13 (continued)** $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	δ	Comments
3332	6 ⁺	1037.1 4	100	2295	4 ⁺	E2		$A_2=+0.23$ 2; $A_4=-0.10$ 2
3359	3 ⁻	938	1.5 5	2421	2 ⁺			
		1064	7.5 15	2295	4 ⁺			
		2374.7 4	91 2	983.5	2 ⁺			
3373	2 ⁺	2387.6 5	89 3	983.5	2 ⁺			
		3369.6 14	11 3	0.0	0 ⁺			
3508	6 ⁺	176	77 3	3332	6 ⁺	[M1]		
		1212.3 6	23 3	2295	4 ⁺	E2		$A_2=+0.22$ 3; $A_4=-0.10$ 4
3618	2 ⁺	1197	9 2	2421	2 ⁺			
		2632.5 8	88 3	983.5	2 ⁺			
		3618	3 1	0.0	0 ⁺			
3703	1 ⁻	2720	62 8	983.5	2 ⁺			
		3703	38 8	0.0	0 ⁺			
3711		2728	100	983.5	2 ⁺			
3741	1 ⁺	2758	72 ^a 6	983.5	2 ⁺			
		3737.8 13	28 ^a 6	0.0	0 ⁺			
3783	3 ⁻ , 4 ⁻	423.2 4	73 4	3359	3 ⁻			
		559	3 1	3224	3 ⁺			
		1486.8 17	24 4	2295	4 ⁺			
3853	3 ⁻	1432	5 1	2421	2 ⁺			
		1558	20 3	2295	4 ⁺			
		2866.7 13	75 3	983.5	2 ⁺			
4036	2 ⁺	812	36 6	3224	3 ⁺			
		1614.3 13	64 6	2421	2 ⁺			
4046	5 ⁽⁻⁾	714	6 1	3332	6 ⁺			
		807	9 2	3239	4 ⁺			
		1750.1 12	85 3	2295	4 ⁺	D+Q	-0.04 7	$A_2=-0.18$ 3; $A_4=+0.04$ 3 δ : $\delta(4 \rightarrow 4) = -0.32 + 16-25$ excluded by comparison to RUL assuming $\Delta\pi=\text{yes}$.
4074	2 ⁺	834.0 8	38 5	3239	4 ⁺			
		1779	10 2	2295	4 ⁺			
		3090.1 11	52 6	983.5	2 ⁺			
4199	(2 ⁺)	346	14 3	3853	3 ⁻			
		458	14 3	3741	1 ⁺			
		496	8 2	3703	1 ⁻			
		975	64 6	3224	3 ⁺			
4258	1 ⁺	555	100	3703	1 ⁻			
4312	1 ⁺	1891	11 2	2421	2 ⁺			
		3328	31 6	983.5	2 ⁺			
		4312	58 7	0.0	0 ⁺			
4348	(2 ⁺)	645	23 4	3703	1 ⁻			
		989	34 10	3359	3 ⁻			
		3364	43 8	983.5	2 ⁺			
4381	(3,4,5 ⁻)	1142	31 5	3239	4 ⁺			
		2086	69 5	2295	4 ⁺			
4389	4 ⁺	1165	45 7	3224	3 ⁺			
		2094	9 [@] 2	2295	4 ⁺			
		3406	46 6	983.5	2 ⁺			
4398	6 ⁺	890	75 5	3508	6 ⁺	D(+Q)	-0.1 3	$A_2=+0.22$ 2; $A_4=-0.08$ 2
		2103	25 5	2295	4 ⁺			
4404	5 ⁽⁺⁾	1072	47 8	3332	6 ⁺	D(+Q)	-0.04 8	$A_2=-0.19$ 3; $A_4=-0.03$ 4
		2109	53 8	2295	4 ⁺			
4458	3 ⁺	2037	40 6	2421	2 ⁺			
		2163	40 6	2295	4 ⁺			
		3474	20 4	983.5	2 ⁺			

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979GI07, 1978Li13** (continued) $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. #	δ	Comments
4564	8 ⁽⁺⁾	1056	10 2	3508	6 ⁺			
		1232	90 2	3332	6 ⁺	Q		$A_2=+0.27$ 2; $A_4=-0.12$ 3
4583	3 ⁻	1224	29 6	3359	3 ⁻			
		2162	9 2	2421	2 ⁺			
		2288	19 4	2295	4 ⁺			
		3600	43 8	983.5	2 ⁺			
4719	4 ⁺	1480	70 4	3239	4 ⁺			
		1495	30 4	3224	3 ⁺			
4794	(1 ⁻ , 2, 3 ⁻)	1421	5 1	3373	2 ⁺			
		2373	55 7	2421	2 ⁺			
		3810	40 6	983.5	2 ⁺			
4795	(3 ⁻ , 4)	749	12 2	4046	5 ⁽⁻⁾			
		942	18 5	3853	3 ⁻			
		1012	10 2	3783	3 ⁻ , 4 ⁻			
		1556	29 5	3239	4 ⁺			
		1571	11 2	3224	3 ⁺			
		2500	20 4	2295	4 ⁺			
4861	2 ⁺ , 3 ⁺ , 4 ⁺	1622	52 8	3239	4 ⁺			
		2566	48 8	2295	4 ⁺			
4885	(2 ⁺ , 3 ⁺ , 4 ⁺)	1526	43 10	3359	3 ⁻			
		2464	57 10	2421	2 ⁺			
4912	(1 ⁺ , 2 ⁺)	1294	44 8	3618	2 ⁺			
		1539	31 6	3373	2 ⁺			
		2491	25 5	2421	2 ⁺			
4916	5 ⁻	870	28 4	4046	5 ⁽⁻⁾			
		1133	50 7	3783	3 ⁻ , 4 ⁻			
		1408	22 4	3508	6 ⁺			
4925	(2, 3, 4) ⁺	544	4 1	4381	(3, 4, 5 ⁻)			
		851	5 1	4074	2 ⁺			
		1686	19 3	3239	4 ⁺			
		1701	13 3	3224	3 ⁺			
		2630	59 7	2295	4 ⁺			
4940	(2, 3, 4) ⁺	1157	6 2	3783	3 ⁻ , 4 ⁻			
		1701	22 4	3239	4 ⁺			
		2645	21 4	2295	4 ⁺			
		3956	51 9	983.5	2 ⁺			
4956	(4 ⁺ , 5, 6 ⁻)	910	16 3	4046	5 ⁽⁻⁾			
		1173	44 7	3783	3 ⁻ , 4 ⁻			
		1448	20 3	3508	6 ⁺			
		1624	20 3	3332	6 ⁺			
4972	0 ⁺	1231	55 10	3741	1 ⁺			
		3988	45 10	983.5	2 ⁺			
4992	5 ⁻	946	62 6	4046	5 ⁽⁻⁾			
		1139	11 2	3853	3 ⁻			
		1209	13 2	3783	3 ⁻ , 4 ⁻			
		1484	14 3	3508	6 ⁺			
5147	4 ⁺	1073	21 6	4074	2 ⁺			
		1908	25 4	3239	4 ⁺			
		1923	24 4	3224	3 ⁺			
		2852	30 5	2295	4 ⁺			
5155	5 ⁽⁺⁾	751	24 4	4404	5 ⁽⁺⁾			
		1647	76 4	3508	6 ⁺	D(+Q)	-0.04 8	$A_2=-0.17$ 5; $A_4=+0.07$ 6
5158	4 ⁺	1919	23 4	3239	4 ⁺			
		1934	33 6	3224	3 ⁺			
		2863	33 6	2295	4 ⁺			

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979GI07, 1978Li13 (continued)** $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	δ	Comments
5158	4 ⁺	4174	11 3	983.5	2 ⁺			
5169	7 ⁺	605	5 1	4564	8 ⁽⁺⁾			
		1661	30 4	3508	6 ⁺	M1+E2	+0.11 +9-4	$A_2=-0.52$ 4; $A_4=+0.01$ 4
		1837	65 5	3332	6 ⁺	M1+E2	+0.09 7	$A_2=-0.48$ 3; $A_4=-0.01$ 3
5197	8 ⁺	633	83 3	4564	8 ⁽⁺⁾	M1(+E2)	-0.03 +25-35	$A_2=+0.34$ 2; $A_4=+0.00$ 2
		1689	14 2	3508	6 ⁺			
		1865	3 1	3332	6 ⁺			
5252	(2 ⁺ , 3, 4, 5 ⁻)	1399	80 6	3853	3 ⁻			
		1469	10 3	3783	3 ⁻ , 4 ⁻			
		2957	10 3	2295	4 ⁺			
5274	(1 ⁻ , 2)	962	12 3	4312	1 ⁺			
		1571	9 2	3703	1 ⁻			
		1915	46 9	3359	3 ⁻			
		2853	33 6	2421	2 ⁺			
5300	(4 ⁺ , 5, 6)	896	27 4	4404	5 ⁽⁺⁾			
		1792	40 6	3508	6 ⁺			
		1968	33 6	3332	6 ⁺			
5312	(5 ⁻)	1266	25 3	4046	5 ⁽⁻⁾			$A_2=+0.26$ 4; $A_4=-0.27$ 5
								Mult., δ : E2 if J=7, M1+E2, -1.25 25 if J=5, or M1+E2, -1.7 +9-12 if J=6.
		1804	15 2	3508	6 ⁺			
		1980	60 4	3332	6 ⁺	D+Q		$A_2=-0.27$ 4; $A_4=+0.00$ 4
								Mult.: if J=6, E1+M2 excluded from δ and comparison to RUL.
								δ : -0.02 +7-3 if J=7, -0.07 +7-9 if J=5, or +1.5 3 if J=6.
5313	2 ⁺	2892	29 7	2421	2 ⁺			
		4330	71 7	983.5	2 ⁺			
5357	(2 ⁺ , 3, 4 ⁺)	1158	20 5	4199	(2 ⁺)			
		1504	11 2	3853	3 ⁻			
		1998	15 3	3359	3 ⁻			
		2118	8 2	3239	4 ⁺			
		3062	11 3	2295	4 ⁺			
		4374	35 7	983.5	2 ⁺			
5383	(3) ⁻	2144	44 7	3239	4 ⁺			
		3088	56 7	2295	4 ⁺			
5491	2 ⁺	2267	32 6	3224	3 ⁺			
		3070	50 9	2421	2 ⁺			
		4508	18 5	983.5	2 ⁺			
5500	4 ⁺	1096	7 2	4404	5 ⁽⁺⁾			
		1102	21 3	4398	6 ⁺			
		1426	4 1	4074	2 ⁺			Probably from J=2 ⁺ member of doublet to J=2 ⁺ 4075 level; see the Adopted Levels.
		1454	3 1	4046	5 ⁽⁻⁾			
		2168	14 4	3332	6 ⁺			
		3205	51 9	2295	4 ⁺			
5522	3 ⁻	1739	36 5	3783	3 ⁻ , 4 ⁻			
		2163	33 9	3359	3 ⁻			
		4538	31 5	983.5	2 ⁺			
5545	(4 ⁺ to 8 ⁺)	2037	22 4	3508	6 ⁺			
		2213	78 4	3332	6 ⁺			
5546	3 ⁻	1165	32 7	4381	(3, 4, 5 ⁻)			
		1693	12 3	3853	3 ⁻			
		2187	13 3	3359	3 ⁻			
		2322	15 4	3224	3 ⁺			

Continued on next page (footnotes at end of table)

$^{45}\text{Sc}(\alpha, p\gamma)$ **1979Gl07, 1978Li13** (continued) $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. #	δ	Comments
5546	3^-	4562	28 6	983.5	2^+			
5569	2^+	1257	16 4	4312	1^+			
		1866	45 10	3703	1^-			
		4586	39 9	983.5	2^+			
5616	$(3)^-$	821	10 2	4795	$(3^-, 4)$			
		1833	50 8	3783	$3^-, 4^-$			
		2257	10 4	3359	3^-			
		4632	30 6	983.5	2^+			
5620	2^+	2381	37 9	3239	4^+			
		2396	29 5	3224	3^+			
		3199	34 7	2421	2^+			
5630	7	1066	39 5	4564	$8^{(+)}$	D(+Q)	-0.03 5	$A_2=-0.28$ 3; $A_4=+0.03$ 3
		2122	11 2	3508	6^+			
		2298	50 6	3332	6^+	D+Q	+0.06 4	$A_2=-0.43$ 3; $A_4=+0.06$ 4
5640	1^+	5640	100	0.0	0^+			
5642	3^-	923	12 2	4719	4^+			
		1261	11 2	4381	$(3, 4, 5^-)$			
		1789	7 2	3853	3^-			
		1939	11 2	3703	1^-			
		2418	10 2	3224	3^+			
		3347	49 8	2295	4^+			
5762	$(4^+, 5, 6^+)$	1716	5 1	4046	$5^{(-)}$			
		2254	34 7	3508	6^+			
		2430	14 3	3332	6^+			
		2523	31 6	3239	4^+			
		3467	16 4	2295	4^+			
5805	$3^-, 4^-$	1759	4 2	4046	$5^{(-)}$			
		2446	96 2	3359	3^-			
5827	3^-	2044	21 4	3783	$3^-, 4^-$			
		2468	37 7	3359	3^-			
		3406	31 5	2421	2^+			
		4844	11 3	983.5	2^+			
5846	3^-	2607	31 5	3239	4^+			
		3551	58 7	2295	4^+			
		4862	11 3	983.5	2^+			
5886	$(4^+ \text{ to } 8^+)$	1488	27 7	4398	6^+			
		2378	73 7	3508	6^+			
5892	$(1^-, 2^+)$	2533	13 3	3359	3^-			
		3471	26 6	2421	2^+			
		4908	28 7	983.5	2^+			
		5892	33 8	0.0	0^+			
5917	2^+	4934	100	983.5	2^+			
5974	$(4^+, 5, 6)$	662	17 3	5312	(5^-)			
		1018	23 4	4956	$(4^+, 5, 6^-)$			
		1570	26 5	4404	$5^{(+)}$			
		2466	22 4	3508	6^+			
		2642	12 3	3332	6^+			
5990	$(4^+, 5, 6^+)$	1586	37 8	4404	$5^{(+)}$			
		1592	28 7	4398	6^+			
		2751	35 6	3239	4^+			
5993	$(2)^+$	3572	57 8	2421	2^+			
		3698	19 4	2295	4^+			
		5010	24 6	983.5	2^+			
6034	$9^+, 7^+$	837	35 5	5197	8^+	M1(+E2)		$A_2=-0.21$ 3; $A_4=+0.00$ 4 $\delta: \delta(9 \rightarrow 8)=0.00$ 5 or $\delta(7 \rightarrow 8)=-0.09$ 9.

Continued on next page (footnotes at end of table)

$^{45}\text{Sc}(\alpha, p\gamma)$ **1979Gl07, 1978Li13 (continued)** $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. #	δ	Comments
6034	$9^+, 7^+$	1470	65 5	4564	$8^{(+)}$	M1+E2		$A_2=-0.35$ 3; $A_4=-0.05$ 4 $\delta: \delta(9 \rightarrow 8)=0.10$ 5 or $\delta(7 \rightarrow 8)=-0.14$ 8.
6036	4^+	3741	100	2295	4^+			
6039	6	870	13 3	5169	7^+			
		1641	80 5	4398	6^+	D(+Q)	0.0 +2-3	$A_2=+0.24$ 3; $A_4=-0.16$ 4 $\delta: \delta(7 \rightarrow 6)=-3.50$ 25 excluded by comparison to RUL assuming $\Delta\pi=\text{yes}$.
		2531	7 2	3508	6^+			
6040	(1,2)	6040	100	0.0	0^+			
6044	(2,3)	1183	24 5	4861	$2^+, 3^+, 4^+$			
		1970	76 5	4074	2^+			
6051		2268	100	3783	$3^-, 4^-$			
6057	(0^+ to 4^+)	5074	100	983.5	2^+			
6084	($4^+, 5, 6^-$)	1680	62 7	4404	$5^{(+)}$			
		2301	13 3	3783	$3^-, 4^-$			
		2576	25 5	3508	6^+			
6102	$10^{(+)}, 8$	1538	100	4564	$8^{(+)}$			$A_2=-0.38$ 3; $A_4=-0.25$ 5 Mult., δ : E2 if J=10 or M1+E2, -0.78 7, if J=8.
6119	($4^+, 5$)	2336	17 3	3783	$3^-, 4^-$			
		2611	16 3	3508	6^+			
		2787	11 2	3332	6^+			
		3824	56 6	2295	4^+			
6126	1	6126	100	0.0	0^+			
6147	(4^+ to 8^+)	1749	100	4398	6^+			
6153	(4^+ to 7^-)	2107	16 6	4046	$5^{(-)}$			
		2645	26 5	3508	6^+			
		2821	58 9	3332	6^+			
6172	$8^+, 6^+$	975	7 2	5197	8^+			
		1003	25 3	5169	7^+	M1+E2		$A_2=-0.39$ 4; $A_4=+0.02$ 4 $\delta: \delta(8 \rightarrow 7)=+0.07$ +7-5 or $\delta(6 \rightarrow 7)=-0.10$ 5. $A_2=+0.33$ 3; $A_4=-0.04$ 4 Mult., δ : D+Q, 0.00 +4-6 if J=8 or E2 if J=6.
		1608	68 5	4564	$8^{(+)}$			
6176	($2^+, 3, 4, 5^-$)	2817	50 20	3359	3^-			
		3881	50 20	2295	4^+			
6183	(2^+ to 6^+)	2944	45 15	3239	4^+			
		3888	55 15	2295	4^+			
6223	(0^+ to 4^+)	5240	100	983.5	2^+			
6234	3^-	2616	35 7	3618	2^+			
		3813	25 6	2421	2^+			
		5250	40 10	983.5	2^+			
6246	(0^+ to 3^+)	2505	40 8	3741	1^+			
		2873	60 8	3373	2^+			
6254	3^-	1873	32 6	4381	($3, 4, 5^-$)			
		2180	41 9	4074	2^+			
		2881	27 6	3373	2^+			
6268	(3^-)	5284	100	983.5	2^+			
6316	($2^+, 3, 4^+$)	2698	8 2	3618	2^+			
		2943	30 5	3373	2^+			
		4021	30 5	2295	4^+			
		5332	32 7	983.5	2^+			
6322	(2,3,4)	2963	50 8	3359	3^-			
		3098	50 8	3224	3^+			
6331	(1^+ to 5^+)	3107	100	3224	3^+			
6337	3^-	2554	100	3783	$3^-, 4^-$			
6363	($3, 4$) $^+$	1959	53 9	4404	$5^{(+)}$			
		3124	47 9	3239	4^+			

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979Gl07, 1978Li13 (continued)** $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π
6394	$(6^+, 7^-)$	764	12 2	5630	7
		1082	10 2	5312	(5^-)
		1197	8 2	5197	8^+
		1438	70 6	4956	$(4^+, 5, 6^-)$
6400	$(4^+ \text{ to } 8^+)$	2002	45 & 9	4398	6^+
		2892	20 & 6	3508	6^+
		3068	25 & 2	3332	6^+
6414	$(2^+ \text{ to } 6^+)$	4119	100	2295	4^+
6434	$(3^- \text{ to } 7^-)$	2388	100	4046	$5^{(-)}$
6451	$(2^+, 3, 4)$	2598	28 6	3853	3^-
		3212	46 10	3239	4^+
		3227	26 6	3224	3^+
6460	$(4^+ \text{ to } 8^+)$	3128	100	3332	6^+
6476	3^-	2623	100	3853	3^-
6491	$(0^+ \text{ to } 4^+)$	4070	60 20	2421	2^+
		5508	40 20	983.5	2^+
6493	$(4^+, 5, 6, 7^-)$	1577	25 5	4916	5^-
		2447	58 8	4046	$5^{(-)}$
		2985	17 3	3508	6^+
6507	$(6^+, 7^-)$	1551	23 8	4956	$(4^+, 5, 6^-)$
		1943	7 2	4564	$8^{(+)}$
		2461	22 4	4046	$5^{(-)}$
		2999	28 5	3508	6^+
		3175	20 4	3332	6^+
6518	4^+	3279	57 9	3239	4^+
		3294	43 9	3224	3^+
6524	$(4^+ \text{ to } 8^+)$	3016	100	3508	6^+
6530	$(1^- \text{ to } 6^-)$	2747	100	3783	$3^-, 4^-$
6536	$(4^+ \text{ to } 7^-)$	2490	37 6	4046	$5^{(-)}$
		3204	63 6	3332	6^+
6539		1614	100	4925	$(2, 3, 4)^+$
6544	$(2^+ \text{ to } 6^+)$	4249	100	2295	4^+
6573	$(5, 6, 7^+)$	943	17 5	5630	7
		2169	10 4	4404	$5^{(+)}$
		2175	22 6	4398	6^+
		3065	33 6	3508	6^+
		3241	18 4	3332	6^+
6584	(3^-)	4289	44 8	2295	4^+
		5600	56 8	983.5	2^+
6605	1^-	6605	100	0.0	0^+
6617	$(4^+ \text{ to } 8^+)$	3109	100	3508	6^+
6634	$(3^-, 4, 5^-)$	2588	34 6	4046	$5^{(-)}$
		2781	38 8	3853	3^-
		3395	28 5	3239	4^+
6653	$(1^- \text{ to } 6^-)$	2870	100	3783	$3^-, 4^-$
6661	$(3^- \text{ to } 7^-)$	2615	100	4046	$5^{(-)}$
6673	$(2, 3, 4)^+$	2890	100	3783	$3^-, 4^-$
6707	$(2^+, 3, 4^+)$	2854	52 8	3853	3^-
		4412	22 5	2295	4^+
		5724	26 6	983.5	2^+
6711	$(4^+, 5, 6, 7^-)$	672	27 6	6039	6
		1795	36 8	4916	5^-
		2665	14 4	4046	$5^{(-)}$
		3203	23 5	3508	6^+

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979Gl07, 1978Li13 (continued)** $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. $\#$	Comments
6744	(4 ⁺ , 5, 6 ⁺)	2698	17 3	4046	5 ⁽⁻⁾		
		3236	14 3	3508	6 ⁺		
		3412	35 7	3332	6 ⁺		
		4449	34 6	2295	4 ⁺		
6757	(6 ⁺ , 7, 8, 9)	723	20 4	6034	9 ⁺ , 7 ⁺		
		1127	10 3	5630	7		
		1560	70 5	5197	8 ⁺		
6770	(4 ⁺ to 8 ⁺)	3438	100	3332	6 ⁺		
6808		2427	100	4381	(3, 4, 5 ⁻)		
6814	(3 ⁻)	3575	100	3239	4 ⁺		
6825	(4 ⁺ to 8 ⁺)	2427	60 10	4398	6 ⁺		
		3317	40 10	3508	6 ⁺		
6831	(0 ⁺ to 4 ⁺)	4410	60 10	2421	2 ⁺		
		5848	40 10	983.5	2 ⁺		
6841	3 ⁻	3602	40 7	3239	4 ⁺		
		4546	60 7	2295	4 ⁺		
6869	(1 ⁻ to 5 ⁻)	3510	100	3359	3 ⁻		
6878	(0 ⁺ to 4 ⁺)	4457	100	2421	2 ⁺		
6880	(6 ⁺ , 7 ⁻)	1568	90 3	5312	(5 ⁻)		
		2316	10 3	4564	8 ⁽⁺⁾		
6885	(4 ⁺ to 8 ⁺)	3377	55 10	3508	6 ⁺		
		3553	45 10	3332	6 ⁺		
6906	10, 8, 6	872	100	6034	9 ⁺ , 7 ⁺	D+Q	A ₂ =-0.27 3; A ₄ =+0.10 4 δ : $\delta(10 \rightarrow 9) = -0.03$ 4, $\delta(8 \rightarrow 9) = -0.02$ 4, $\delta(8 \rightarrow 7) = -0.05$ +5-2, or $\delta(6 \rightarrow 7) = -0.05$ +5-2.
6916	(3 ⁻ to 7 ⁻)	2870	100	4046	5 ⁽⁻⁾		
6944	(4 ⁺ , 5, 6, 7 ⁻)	2898	70 10	4046	5 ⁽⁻⁾		
		3436	30 10	3508	6 ⁺		
6955	(5 ⁺ to 8 ⁺)	1786	30 5	5169	7 ⁺		
		3447	70 5	3508	6 ⁺		
6966	(2 ⁺ to 6 ⁺)	4671	100	2295	4 ⁺		
6972	(0 ⁺ to 4 ⁺)	5988	100	983.5	2 ⁺		
6975	(3 ⁻ to 7 ⁻)	1983	34 6	4992	5 ⁻		
		2019	66 6	4956	(4 ⁺ , 5, 6 ⁻)		
6984	(1 ⁻ to 5 ⁻)	3131	100	3853	3 ⁻		
6985	(6 ⁺ , 7)	1816	13 3	5169	7 ⁺		
		2029	30 6	4956	(4 ⁺ , 5, 6 ⁻)		
		2421	25 5	4564	8 ⁽⁺⁾		
		3477	32 7	3508	6 ⁺		
7033	(4 ⁺)	2652	100	4381	(3, 4, 5 ⁻)		
7040	(6 ⁺ , 7, 8, 9 ⁺)	467	10 2	6573	(5, 6, 7 ⁺)		
		2476	90 10	4564	8 ⁽⁺⁾		
7054	(3 ⁻)	3695	100	3359	3 ⁻		
7069	(3 ⁻ , 4 ⁺)	2870	100	4199	(2 ⁺)		
7075	(6 ⁺ to 10 ⁺)	973	40 10	6102	10 ⁽⁺⁾ , 8		
		1878	30 6	5197	8 ⁺		
		2511	30 6	4564	8 ⁽⁺⁾		
7093	(5 ⁺ to 8 ⁺)	1924	20 10	5169	7 ⁺		
		3761	80 10	3332	6 ⁺		
7100	(2 ⁺ to 6 ⁺)	4805	100	2295	4 ⁺		
7111	(5 to 9)	1481	100	5630	7		
7118	(6 ⁺ , 7 ⁻)	1806	22 5	5312	(5 ⁻)		
		1921	14 2	5197	8 ⁺		
		2554	14 2	4564	8 ⁽⁺⁾		
		2720	18 3	4398	6 ⁺		

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$^{45}\text{Sc}(\alpha, p\gamma)$ **1979GI07, 1978LI13** (continued) $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	Comments
7118	(6 ⁺ , 7 ⁻)	3610	10 2	3508	6 ⁺		
		3786	22 4	3332	6 ⁺		
7149	(4 ⁺ to 8 ⁺)	2751	100	4398	6 ⁺		
7162	(4 ⁺ to 8 ⁺)	3654	100	3508	6 ⁺		
7183	(0 ⁺ to 4 ⁺)	4762	40 10	2421	2 ⁺		
		6200	60 10	983.5	2 ⁺		
7199	(0 to 4 ⁺)	4778	100	2421	2 ⁺		
7221	(1,2,3,4 ⁺)	2840	60 7	4381	(3,4,5 ⁻)		
		3147	40 7	4074	2 ⁺		
7256	(4 ⁺)	3210	60 9	4046	5 ⁽⁻⁾		
		4017	40 9	3239	4 ⁺		
7274	(4 ⁺)	1962	26 5	5313	2 ⁺		
		3766	51 8	3508	6 ⁺		
		3942	23 5	3332	6 ⁺		
7289	3 ⁺	6306	100	983.5	2 ⁺		
7322	3 ⁻	6339	100	983.5	2 ⁺		
7326	(6 ⁺ to 10 ⁺)	2129	65 7	5197	8 ⁺		
		2762	35 7	4564	8 ⁽⁺⁾		
7344	(4 ⁺ to 8 ⁺)	2946	100	4398	6 ⁺		
7353	(5 to 9)	1723	100	5630	7		
7374	11,9,7	468	10 2	6906	10,8,6		
		1272	90 2	6102	10 ⁽⁺⁾ ,8	D+Q	$A_2=-0.30$ 4; $A_4=+0.05$ 4 δ : $\delta(11\rightarrow10)=0.00$ 6, $\delta(9\rightarrow10)=-0.05$ 7, $\delta(9\rightarrow8)=0.00$ 7, or $\delta(7\rightarrow8)=-0.07$ 9.
7387		814	100	6573	(5,6,7 ⁺)		
7427	9,7	1393	66 6	6034	9 ⁺ ,7 ⁺		$A_2=+0.45$ 3; $A_4=-0.19$ 4 Mult., δ : D+Q, -0.60 15, if $9\rightarrow9$, Q if $9\rightarrow7$, or D+Q, -0.67 15, if $7\rightarrow7$.
		2230	14 3	5197	8 ⁺		
		2863	20 5	4564	8 ⁽⁺⁾		
7431	(2,3,4) ⁺	5136	100	2295	4 ⁺		
7442	(4 ⁺ ,5,6 ⁺)	3044	35 8	4398	6 ⁺		
		5147	65 8	2295	4 ⁺		
7476	(3 ⁺ to 7 ⁺)	2520	68 8	4956	(4 ⁺ ,5,6 ⁻)		
		3072	32 8	4404	5 ⁽⁺⁾		
7483	(0 ⁺ to 4 ⁺)	6500	100	983.5	2 ⁺		
7497	(4 ⁺)	2185	100	5312	(5 ⁻)		
7531	(6 ⁺ ,7,8 ⁺)	1901	19 3	5630	7		
		2334	44 7	5197	8 ⁺		
		3133	37 6	4398	6 ⁺		
7535		460	10 5	7075	(6 ⁺ to 10 ⁺)		
		629	30 5	6906	10,8,6		
		778	25 5	6757	(6 ⁺ ,7,8,9)		
		1433	35 5	6102	10 ⁽⁺⁾ ,8		
7556	(2 ⁺ to 6 ⁺)	5261	100	2295	4 ⁺		
7571	(4 ⁺ to 8 ⁺)	4239	100	3332	6 ⁺		
7587	(5,6,7,8 ⁺)	1415	21 4	6172	8 ⁺ ,6 ⁺		
		1957	37 6	5630	7		
		4255	42 8	3332	6 ⁺		
7623	(6 ⁺ ,7 ⁻)	2311	50 10	5312	(5 ⁻)		
		3059	50 10	4564	8 ⁽⁺⁾		
7656	(6 ⁺ to 10 ⁺)	3092	100	4564	8 ⁽⁺⁾		
7668	10,8	1566	100	6102	10 ⁽⁺⁾ ,8	D+Q	$A_2=+0.29$ 4; $A_4=-0.25$ 5 δ : $\delta(10\rightarrow10)=-0.90$ 14 or $\delta(8\rightarrow8)=-0.95$ 15.
7709	(3 ⁻ to 7 ⁻)	3663	100	4046	5 ⁽⁻⁾		

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$^{45}\text{Sc}(\alpha, p\gamma)$ 1979GI07, 1978Li13 (continued) $\gamma(^{48}\text{Ti})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [#]	Comments
8091	12,10,8,6	717	100	7374	11,9,7	D+Q	$A_2=-0.34$ 5; $A_4=+0.01$ 6 δ : $\delta(12 \rightarrow 11)=+0.02$ 6, $\delta(10 \rightarrow 11)=-0.05$ 6, $\delta(10 \rightarrow 9)=+0.02$ 6, $\delta(8 \rightarrow 9)=-0.05$ 6, $\delta(8 \rightarrow 7)=+0.02$ 6, or $\delta(6 \rightarrow 7)=-0.07$ 6.
8323	10,8,6	896	100	7427	9,7	D+Q	$A_2=-0.37$ 6; $A_4=-0.05$ 7 δ : $\delta(10 \rightarrow 9)=+0.05$ 7, $\delta(8 \rightarrow 9)=-0.14$ 8, $\delta(8 \rightarrow 7)=+0.05$ +10-5, $\delta(6 \rightarrow 7)=-0.19$ +13-3.

[†] Values with uncertainties are from 1978Li13 and those without uncertainties are deduced (in 1985A114 evaluation) from level energies listed in 1979GI07, unless otherwise noted. Note that 1979GI07 report 189 excited states with energies and γ branching ratios determined from their measurements of γ transitions, which, however, are not listed by the authors.

[‡] %photon branching from each level (1979GI07).

[#] D,Q or D+Q with δ under comments from $p\gamma(\theta)$ in 1979GI07 and magnetic or electric nature from comparison of corresponding transition strength to RUL where $T_{1/2}$ is measured.

[@] Discrepant with adopted $I_\gamma(2421\gamma)/I_\gamma(1438\gamma)=0.054$ 3 and $I_\gamma(2092\gamma)/I_\gamma(3404\gamma)=0.85$ 12.

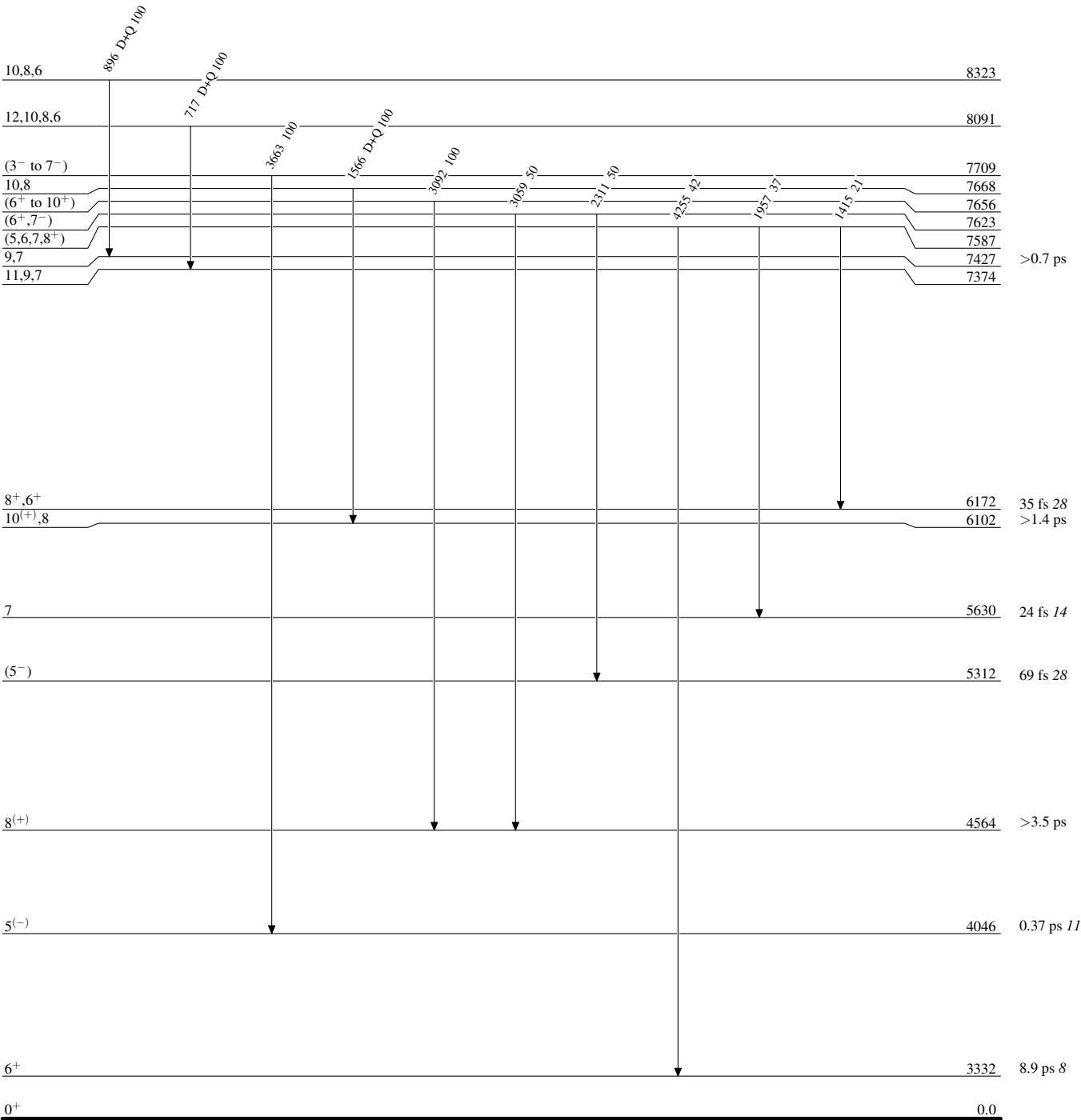
[&] Total $I_\gamma=90\%$ indicates an error in table 1 of 1979GI07 (1985A114 evaluation).

^a Branches agree with (n, γ) and (p,p' γ) only if inverted; probable inadvertent error by 1979GI07 (1985A114 evaluation).

$^{45}\text{Sc}(\alpha, p\gamma)$ 1979Gl07, 1978Li13

Level Scheme

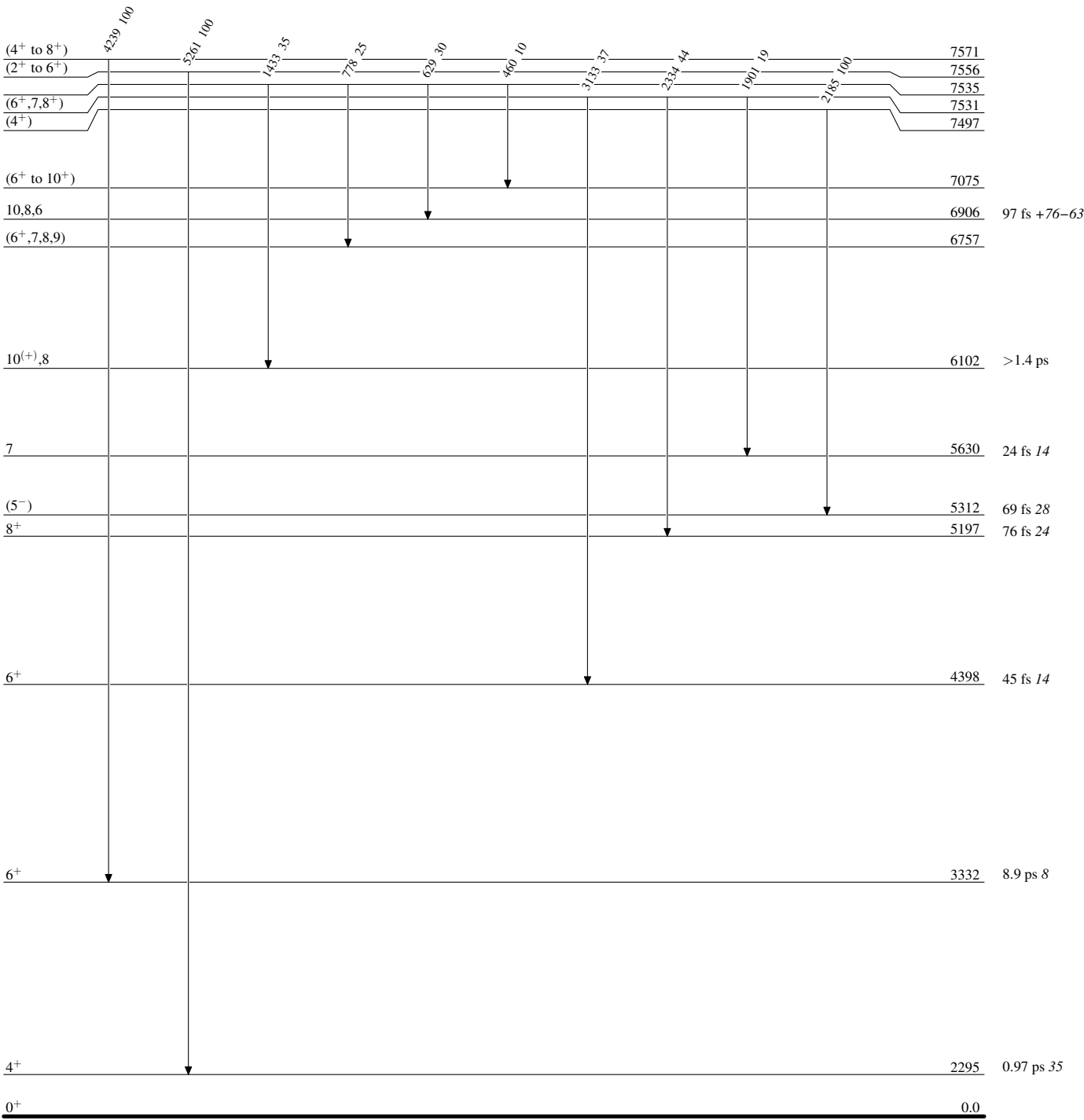
Intensities: % photon branching from each level



⁴⁵Sc($\alpha,\text{p}\gamma$) 1979GI07,1978Li13

Level Scheme (continued)

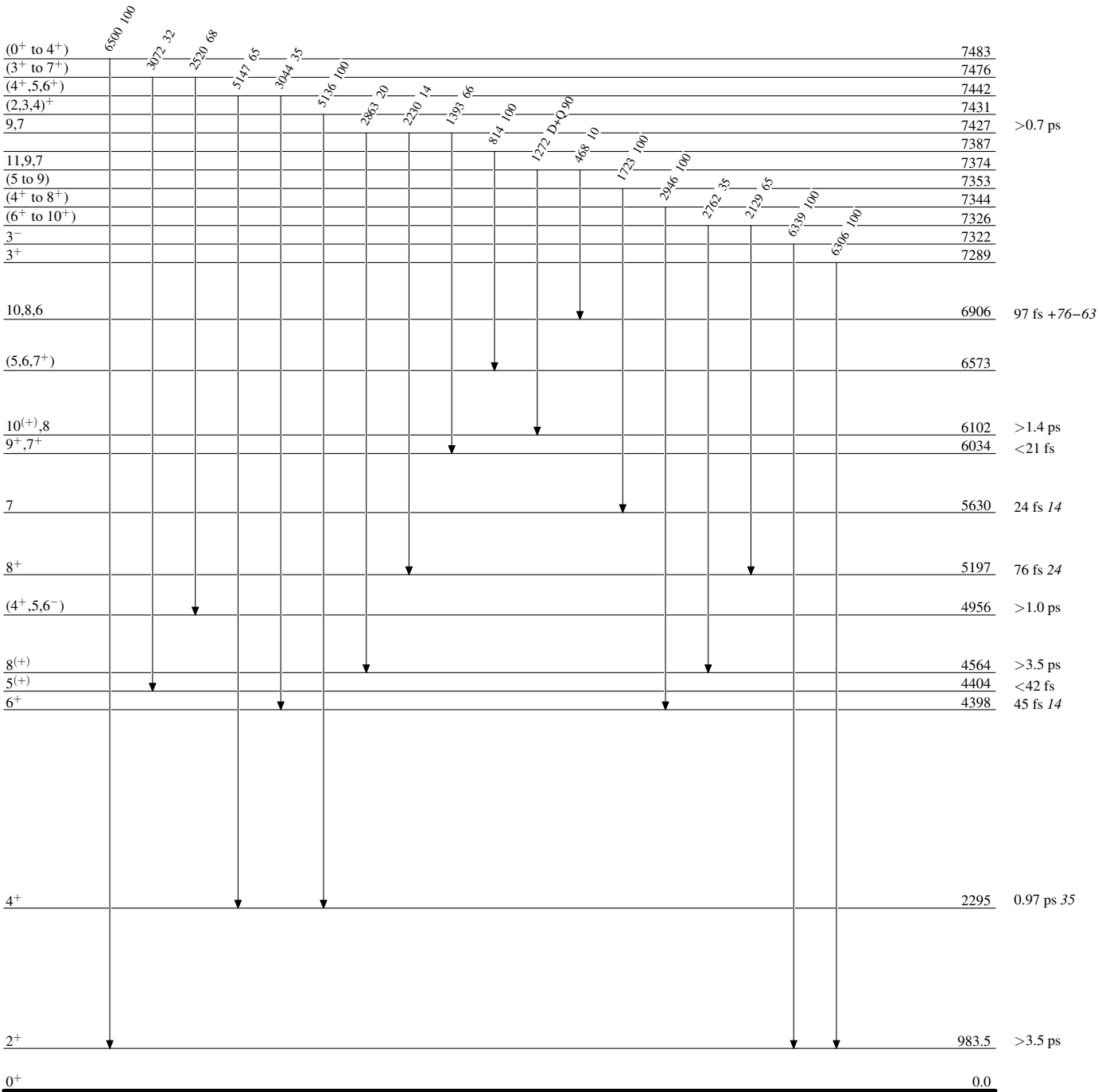
Intensities: % photon branching from each level



⁴⁵Sc(α , γ) 1979G107,1978Li13

Level Scheme (continued)

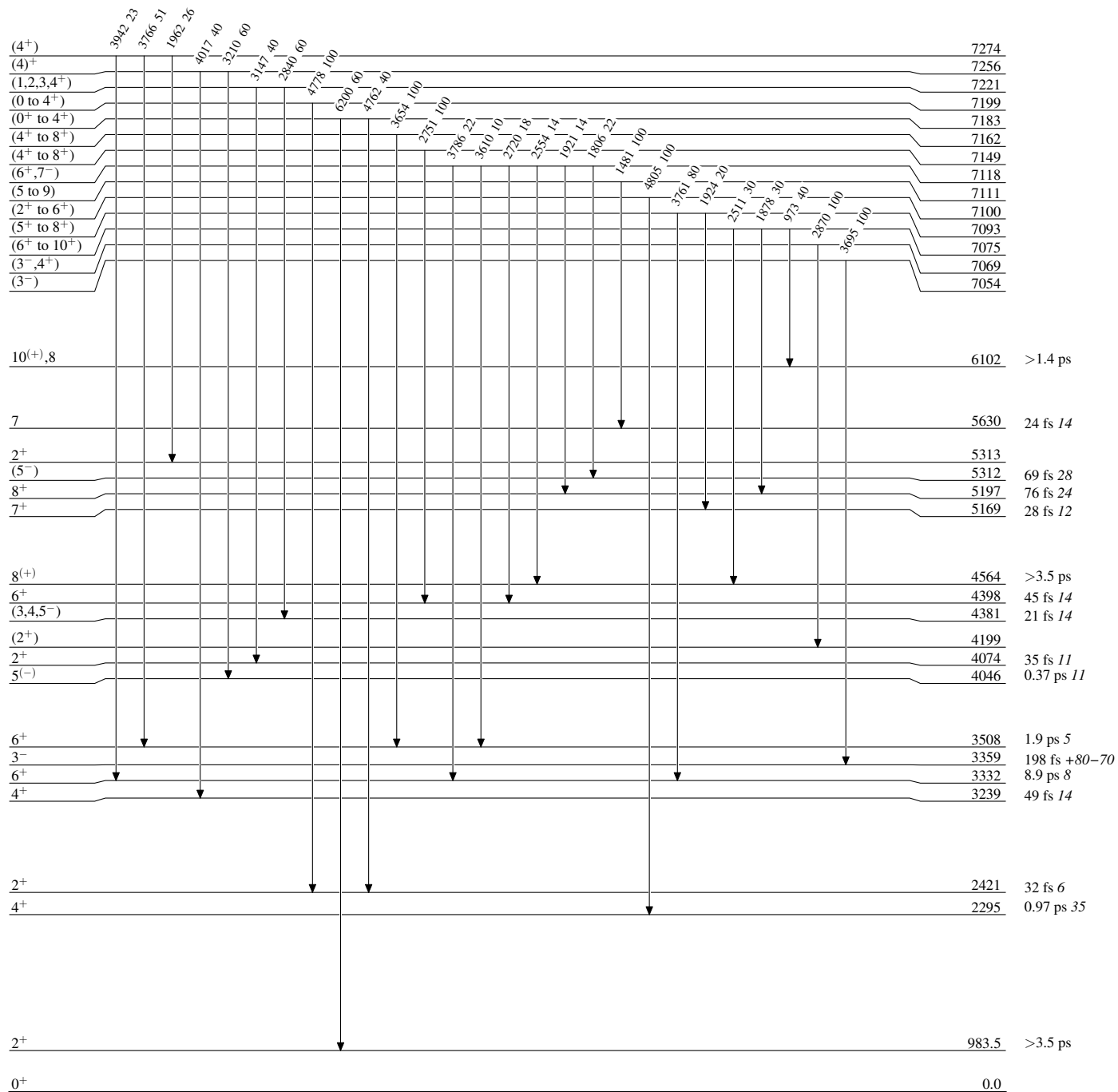
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979Gl07, 1978Li13

Level Scheme (continued)

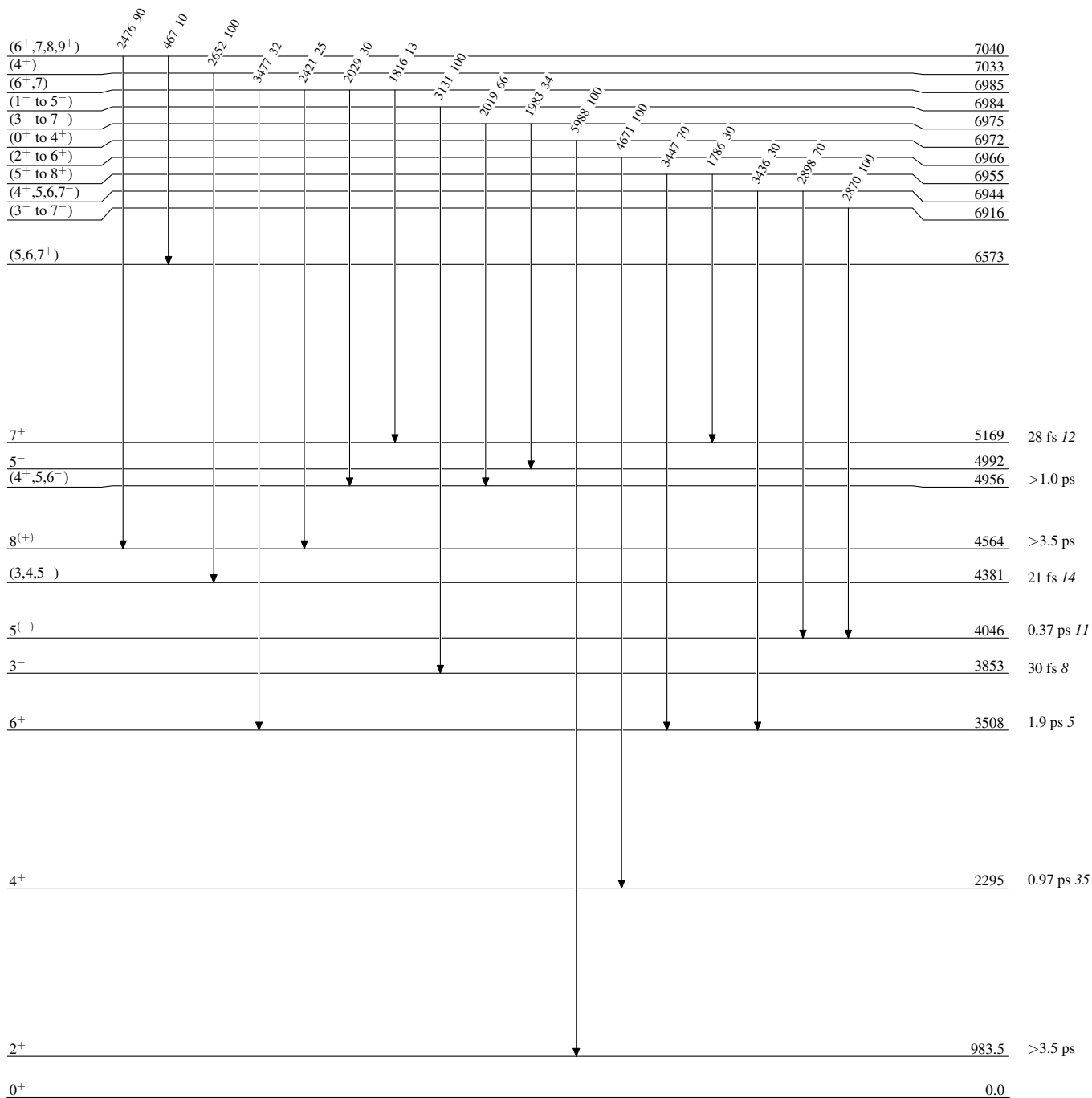
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979Gl07, 1978Li13

Level Scheme (continued)

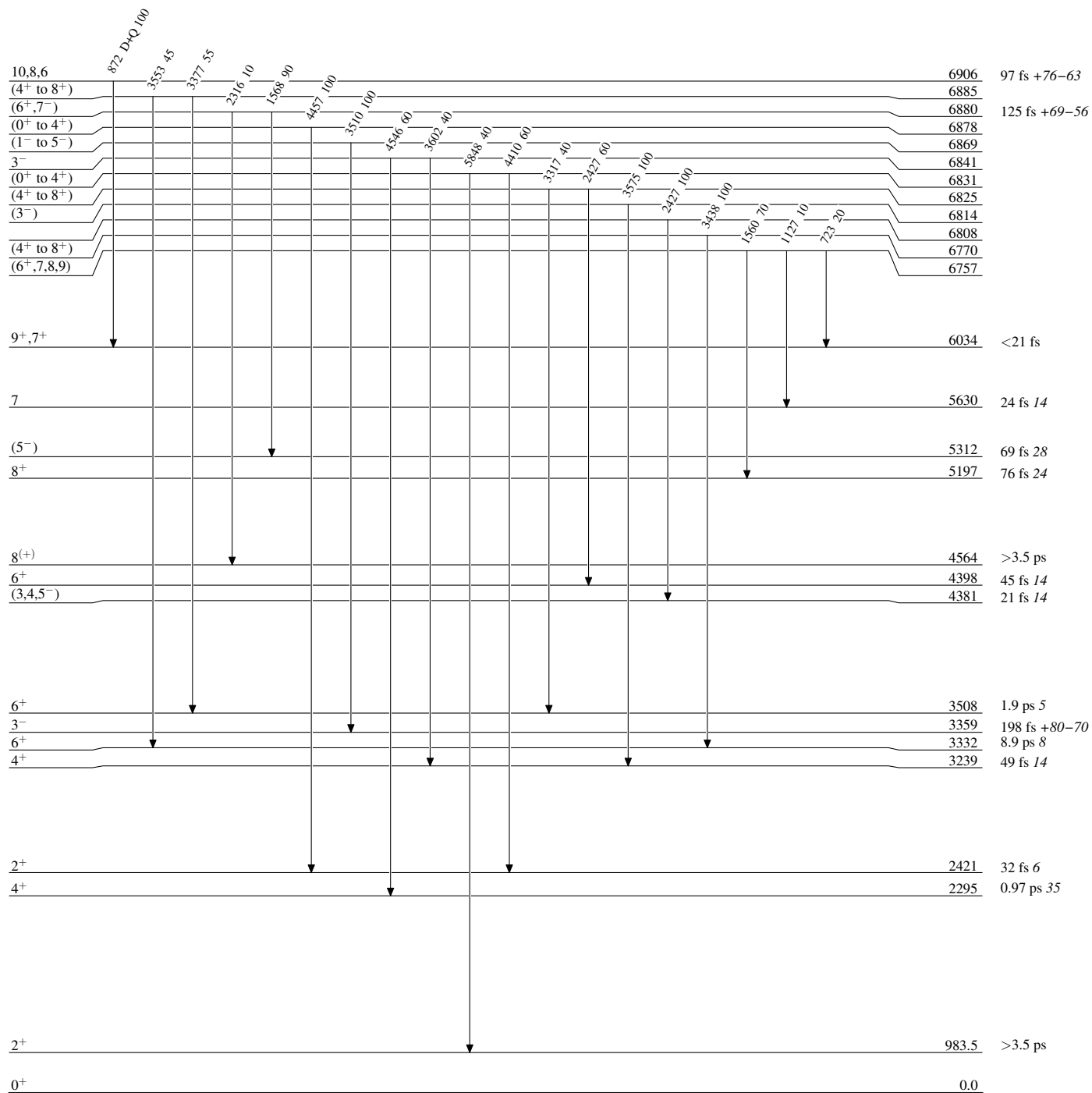
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979Gl07, 1978Li13

Level Scheme (continued)

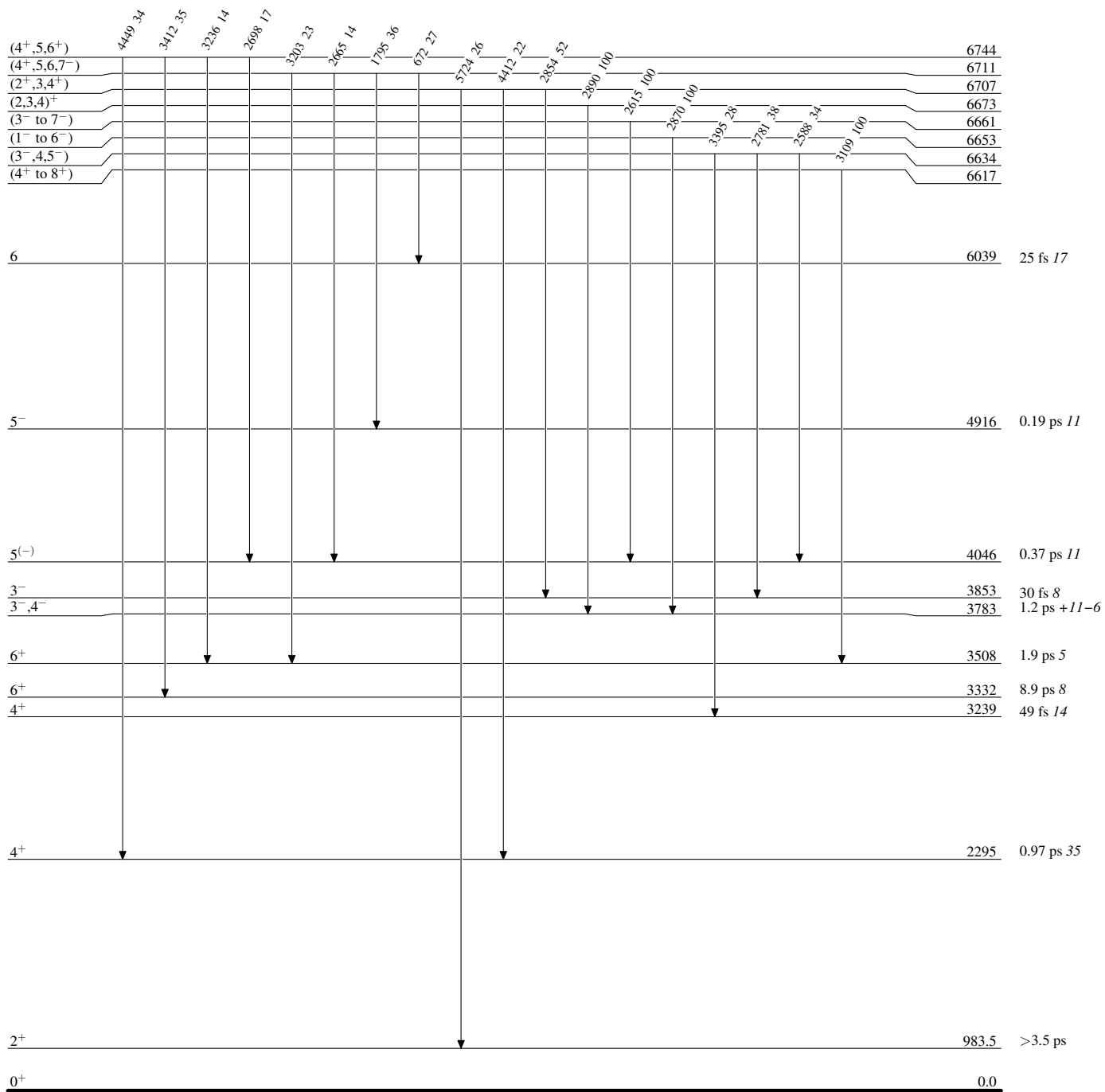
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979GI07, 1978LI13

Level Scheme (continued)

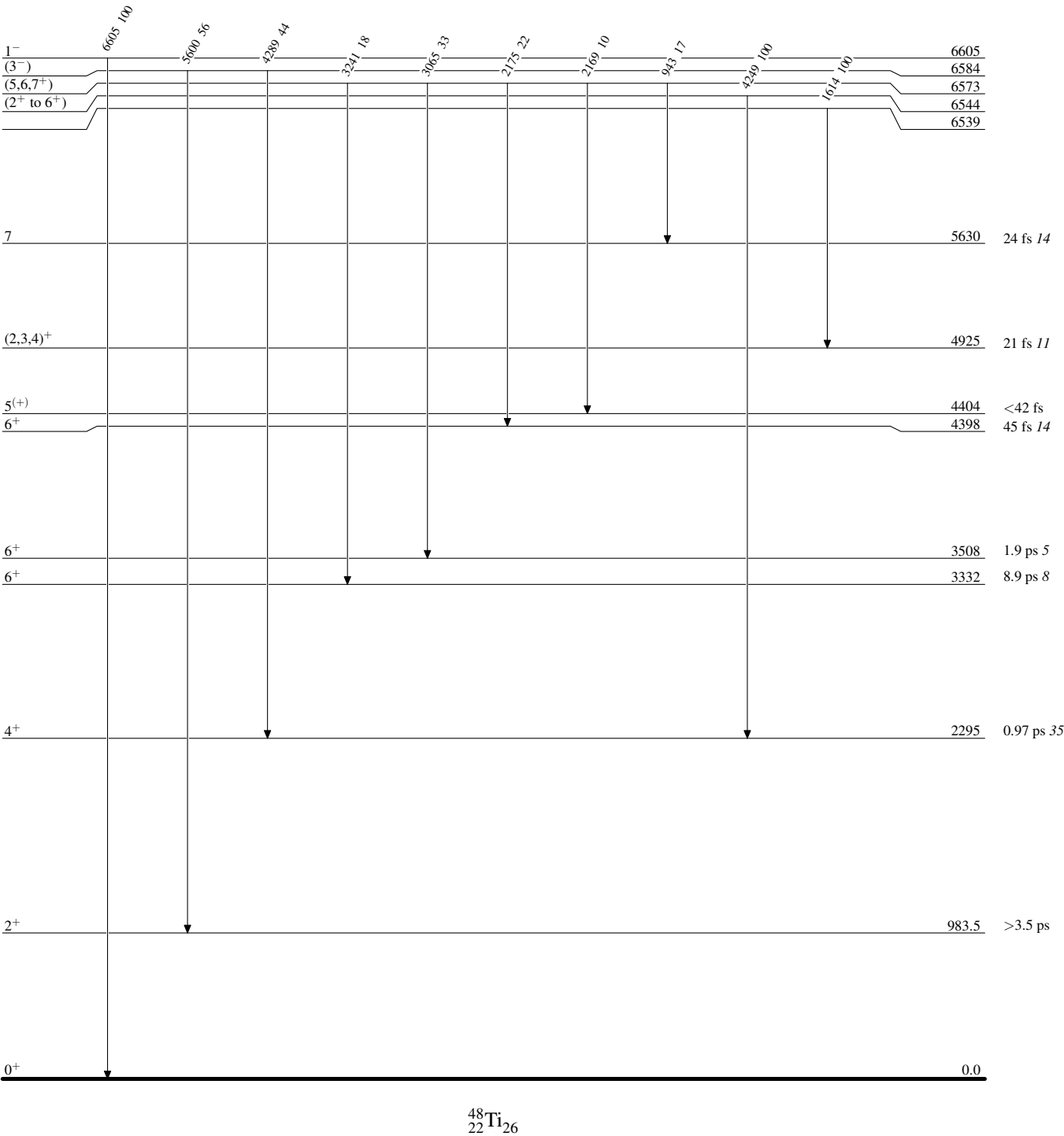
Intensities: % photon branching from each level



⁴⁵Sc(α ,p γ) 1979Gl07,1978Li13

Level Scheme (continued)

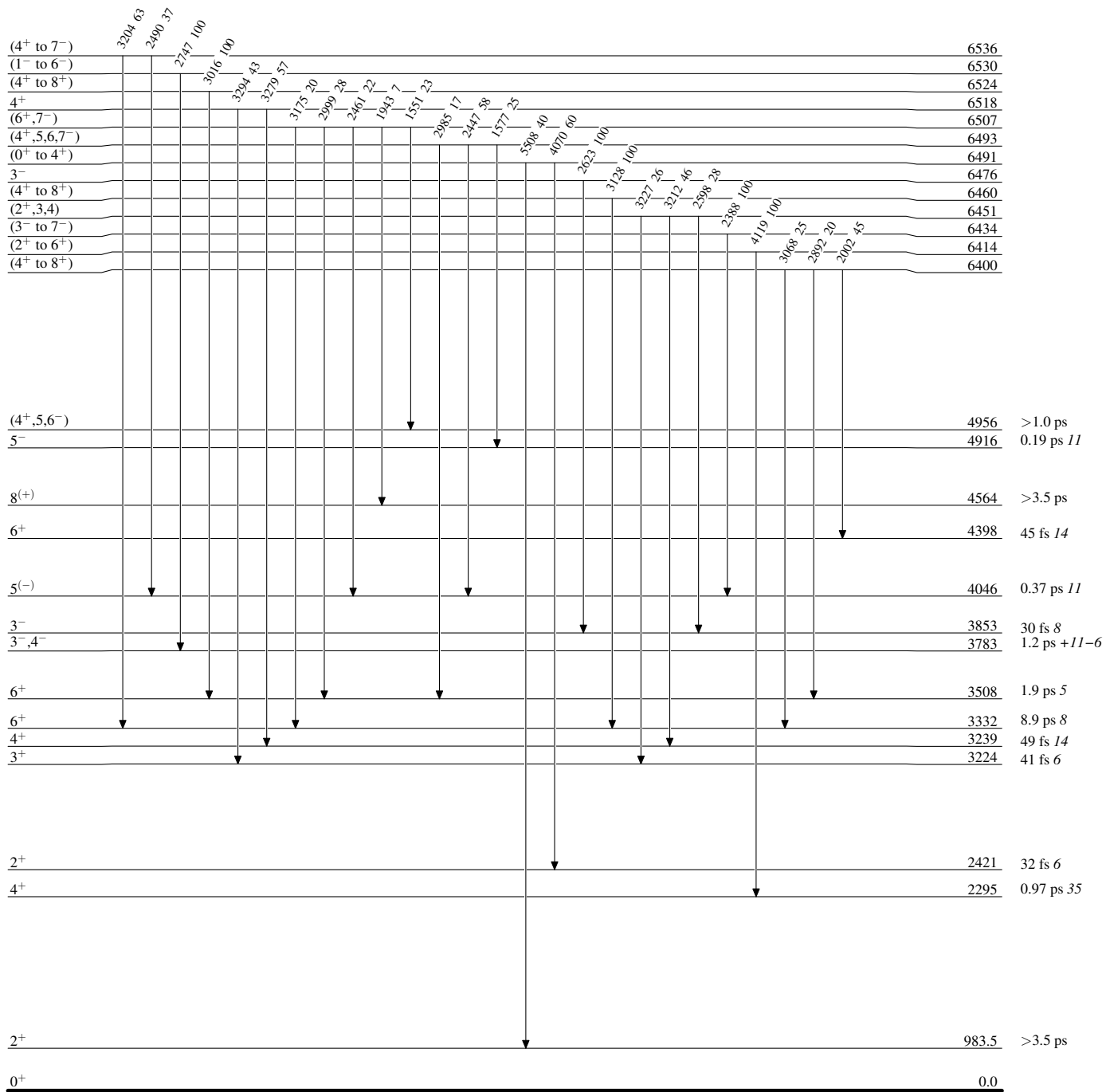
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979GI07, 1978LI13

Level Scheme (continued)

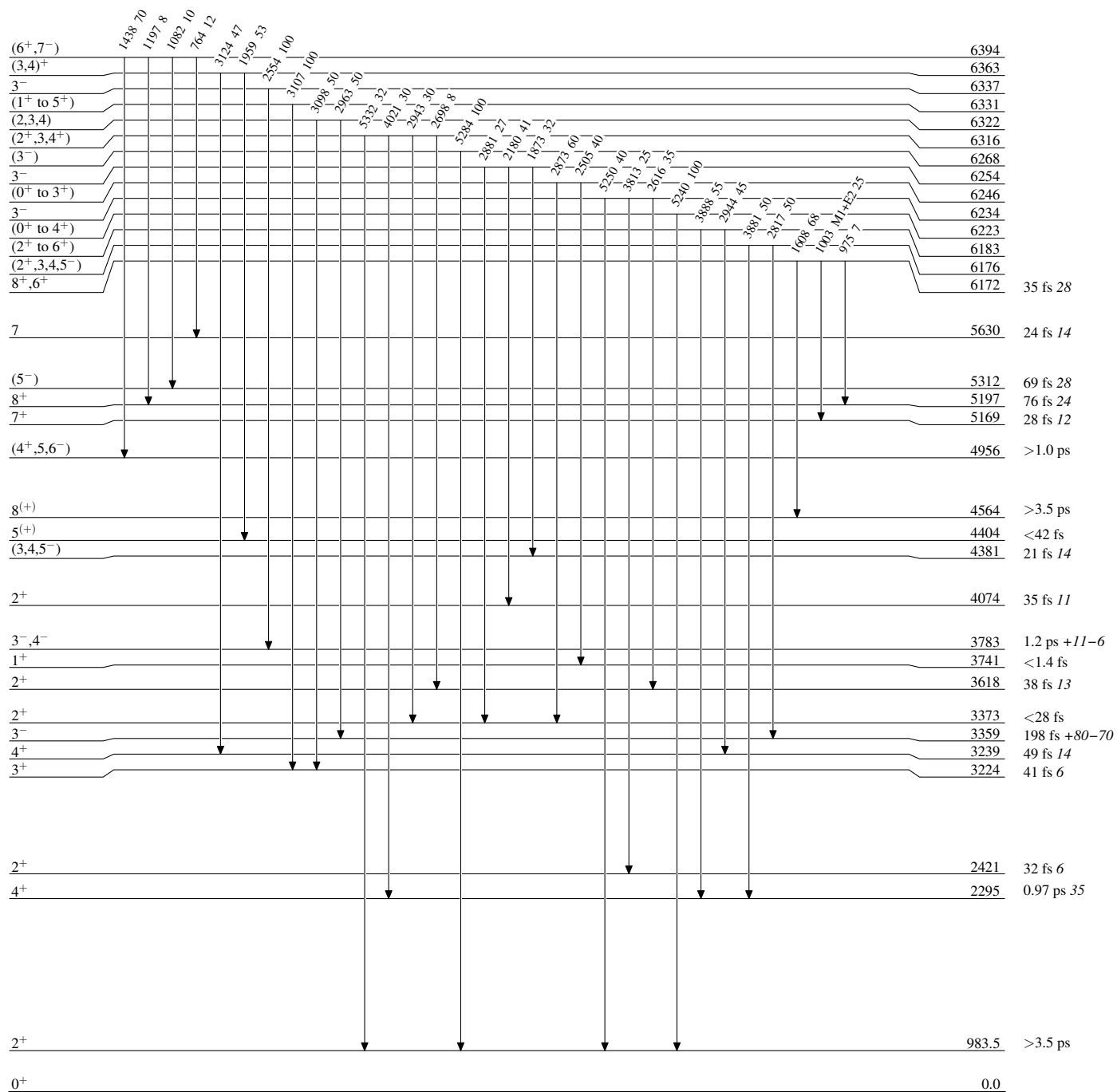
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979Gl07, 1978Li13

Level Scheme (continued)

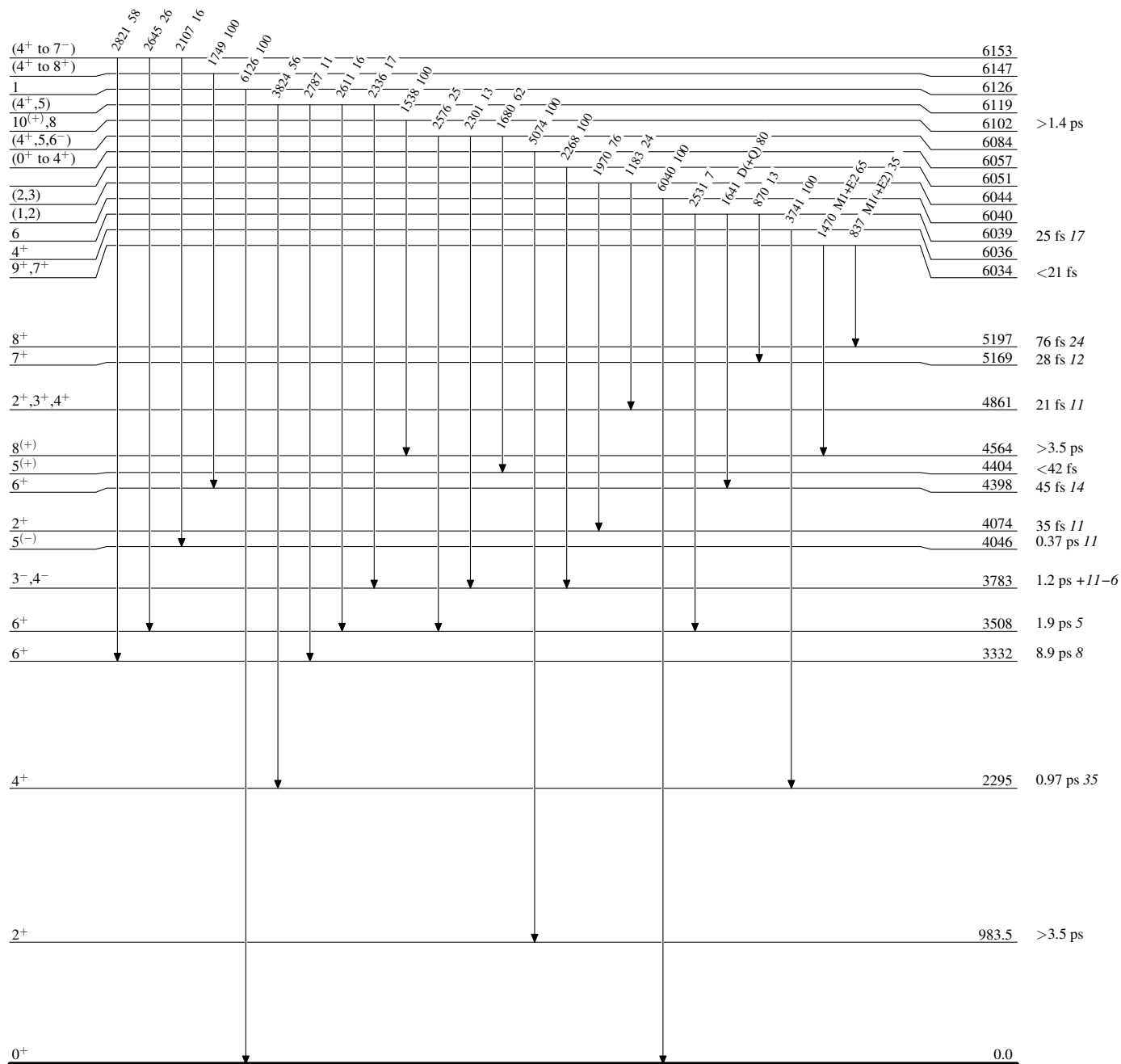
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979GI07, 1978Li13

Level Scheme (continued)

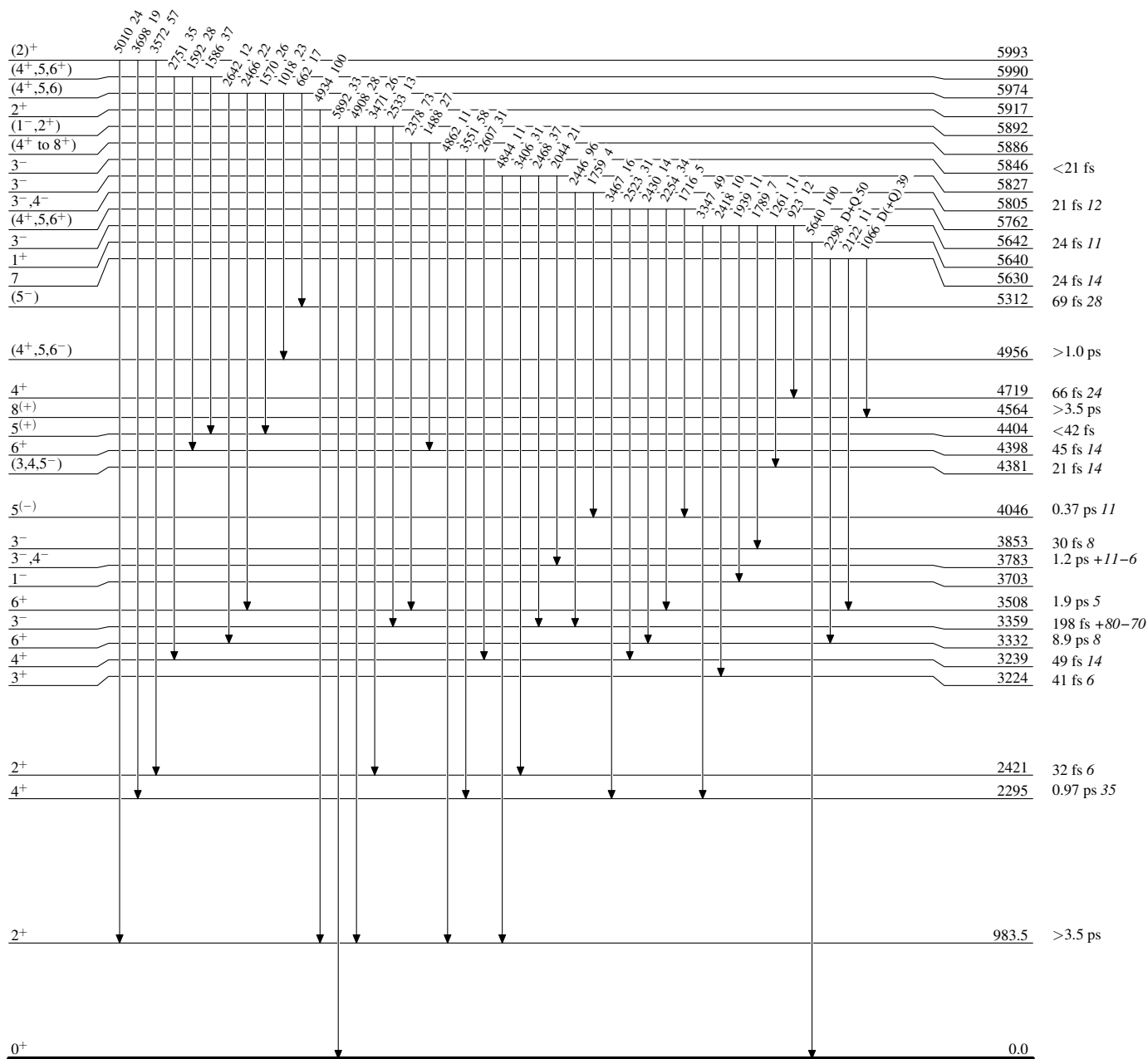
Intensities: % photon branching from each level

 $^{48}\text{Ti}_{26}$

$^{45}\text{Sc}(\alpha, p\gamma)$ 1979Gl07, 1978Li13

Level Scheme (continued)

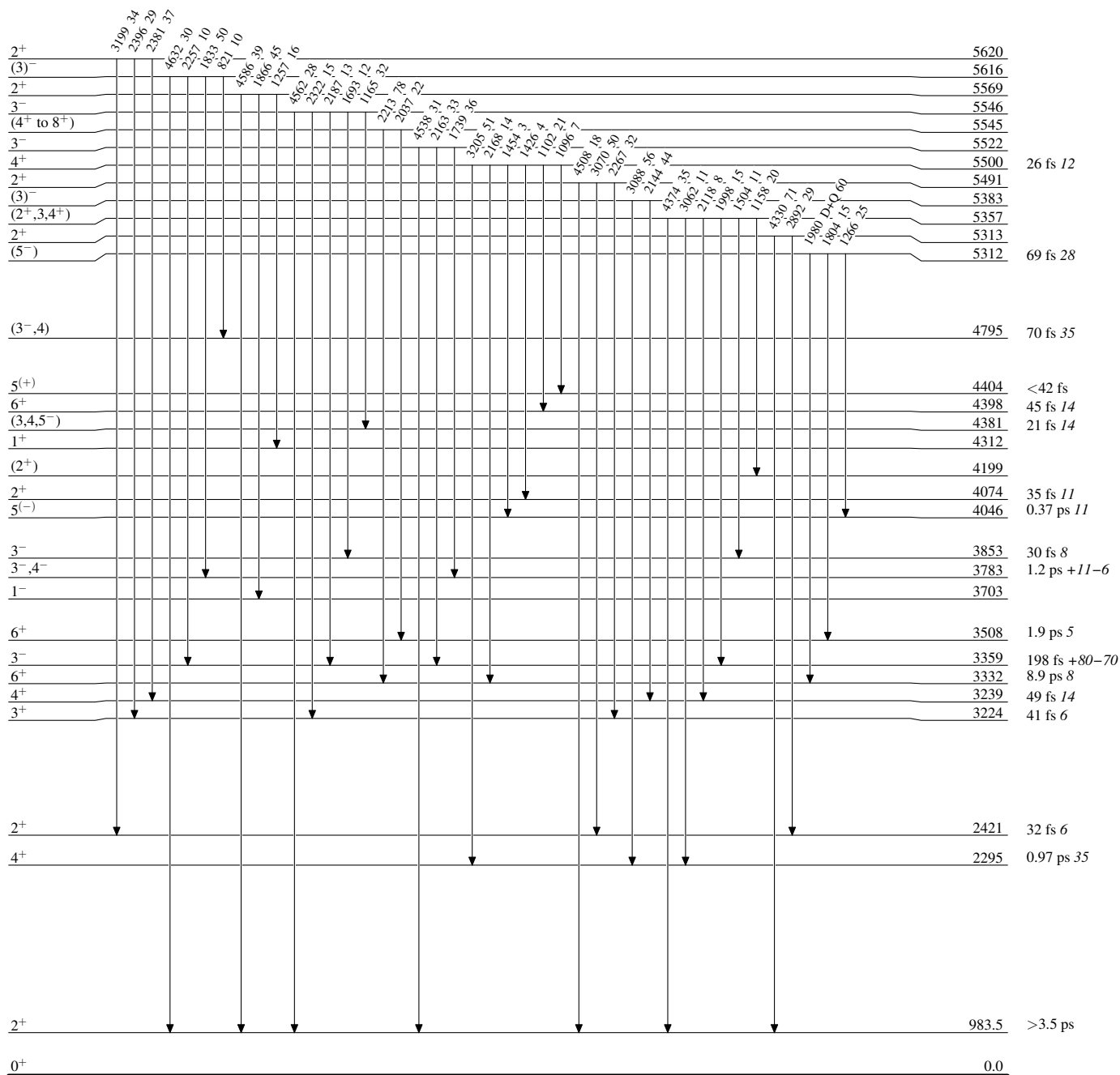
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979GI07, 1978Li13

Level Scheme (continued)

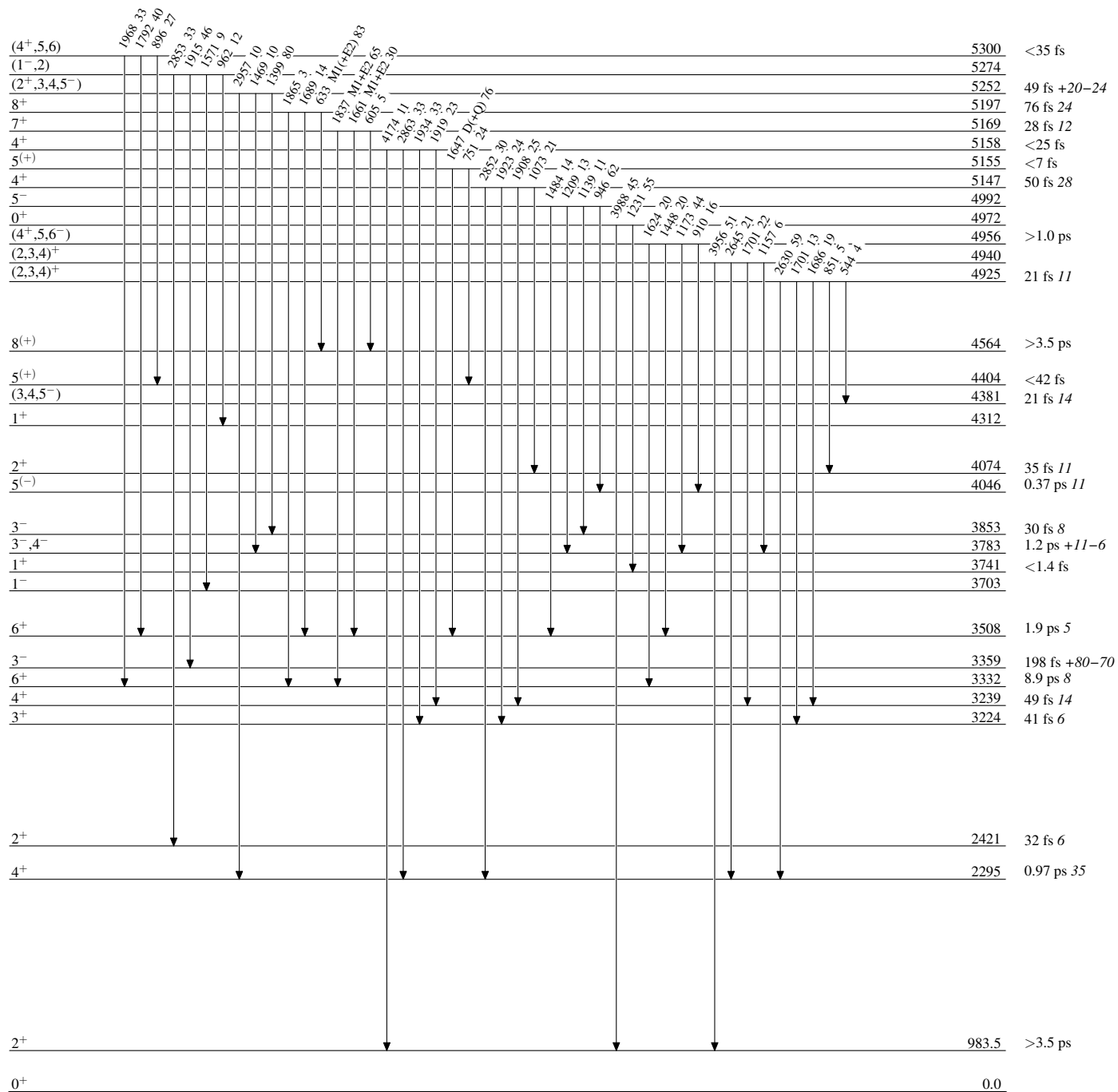
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979Gl07, 1978Li13

Level Scheme (continued)

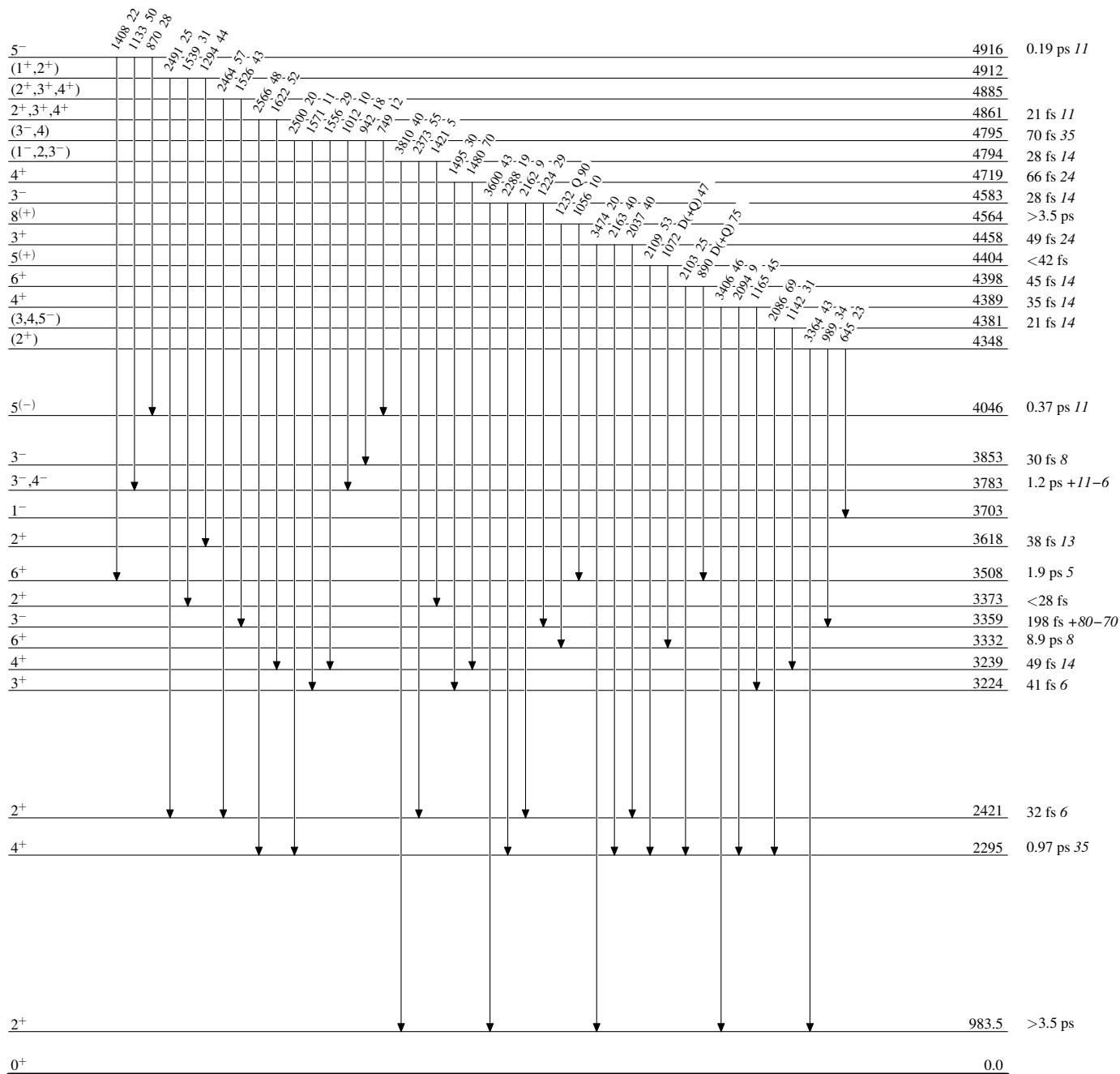
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979GI07, 1978Li13

Level Scheme (continued)

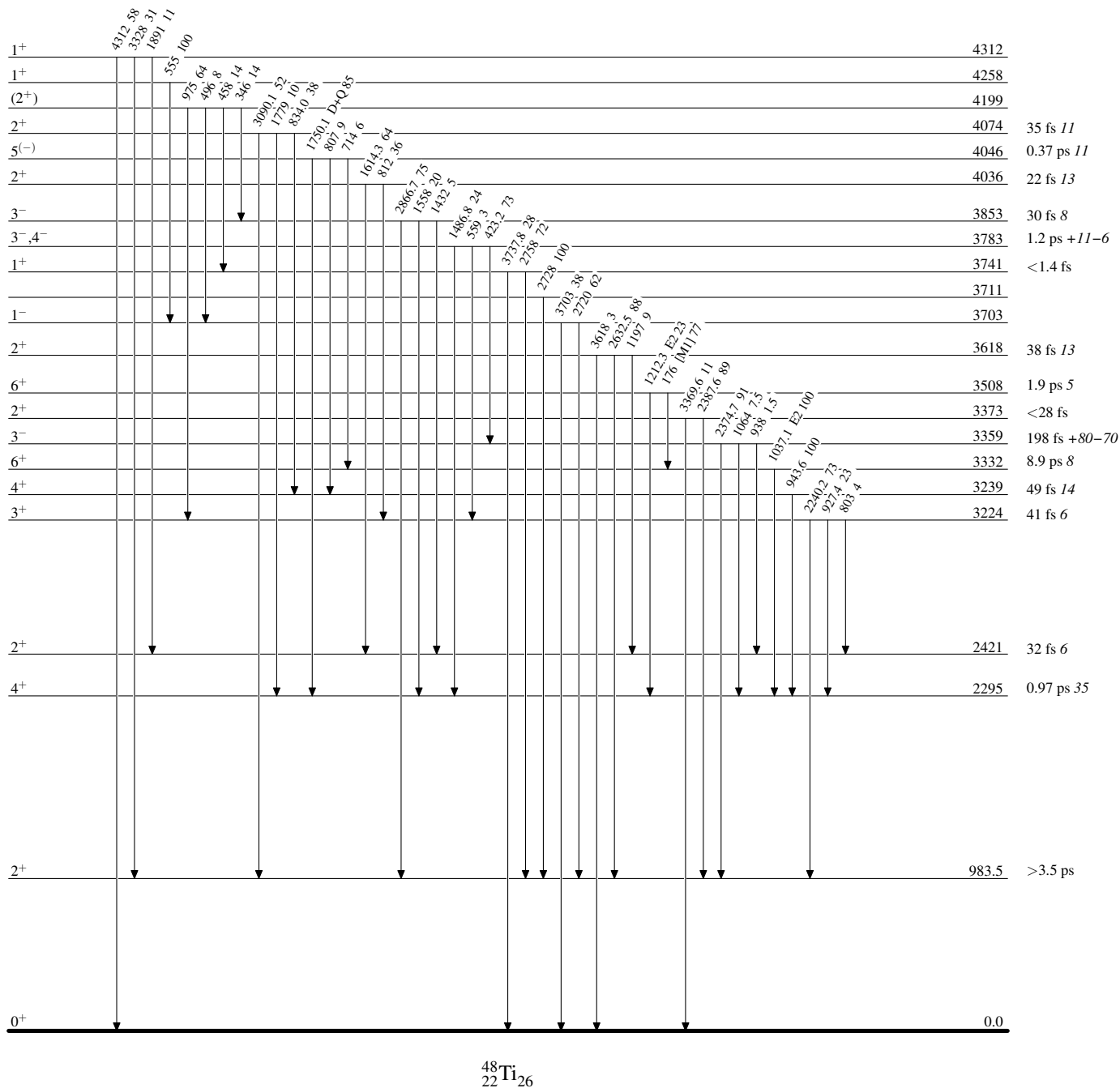
Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha, p\gamma)$ 1979G107, 1978Li13

Level Scheme (continued)

Intensities: % photon branching from each level



$^{45}\text{Sc}(\alpha,\text{p}\gamma)$ 1979GI07,1978Li13

Level Scheme (continued)

Intensities: % photon branching from each level

