^{46}Ca(p,p),(p,p′),(p,γ) IAR 1975Vi02,1971ViZU

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. Ota and E. A. Mccutchan	NDS 203,1 (2025)	1-Apr-2025

1971ViZU,1971Vi06: E=1-1.9 MeV. Measured γ′s and γ-ray excitation functions (NaI). Observed ≈500 resonances; identified ≈40 states below 4 MeV. Partially superseded by 1975Vi02.

1975Vi02: E=1820-1900 keV. Measured σ(θ) using 7 Si at back angles. Measured γ-excitation functions and Iγ (θ=55°,90°) using NaI(Tl). Observed 13 resonances.

Other: 1967Ga05.

^{47}Sc Levels

E(level)[†]	Jπ[‡]
0.0	7/2⁻
767 2	(3/2)⁺
808 2	3/2⁻
1146 2	11/2⁻
1296 2	5/2⁻
1390 2	1/2⁺
1404 2	5/2⁺
1797 2	3/2,5/2⁻,7/2⁻
1878 2	9/2⁻
2002 2	3/2⁺
2206 2	(5/2⁻,7/2⁻)
2378 2	5/2⁺
2409 2	7/2,9/2
2499 2	7/2⁻
2528 2	1/2⁺
2650 2	
2810[#] 2	1/2⁻,3/2⁻
2836[#] 2	1/2⁻,3/2⁻
2909 2	
2941 2	
3133 2	–
3205[#] 2	1/2⁻,3/2⁻
3262[#] 2	
3290 2	
3576 2	
3728 2	
4019 2	
4085 2	3/2⁻
4099 2	
4408 2	
4475 2	
4553 2	3/2⁺,5/2⁺
4609 2	1/2⁺
4631 2	1/2⁻,3/2⁻
4690 2	
4721 2	
4792 2	
4802 2	
4831 2	
4956 2	
4998 2	
5151 2	–
5509 2	

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^{46}Ca(p,p),(p,p′),(p,γ) IAR 1975Vi02,1971ViZU (continued)

^{47}Sc Levels (continued)

E(level)†	Jπ‡	Comments
5600 *2*		
6383 *2*		
6584 *2*		
6724 *2*		
10287.0 *23*		Γ_γ=0.40 eV *25*; Γ_p=100 eV *20* Ep=1839.9 *20*.
10294.9 *23*		Γ_γ=0.20 eV *10*; Γ_p=20 eV *10* Ep=1848.0 *20*.
10299.7 *23*		Γ_γ=0.17 eV *25*; Γ_p=90 eV *30* Ep=1852.9 *20*.
10303.9 *23*		Γ_γ=0.16 eV *25*; Γ_p=20 eV *10* Ep=1857.2 *20*.
10305.1 *23*	(3/2$^-$)@	T=7/2; Γ_γ=0.50 eV *30*; Γ_p=150 eV *40* Ep=1858.4 *20*.
10306.0 *23*		Γ_γ=0.09 eV *20*; Γ_p=30 eV *20* Ep=1848.0 *20*.
10307.5 *23*	(3/2$^-$)@	T=7/2; Γ_γ=1.36 eV *55*; Γ_p=600 eV *60* Ep=1860.9 *20*.
10308.6 *23*		Γ_γ=0.14 eV *20*; Γ_p=80 eV *40* Ep=1862.0 *20*.
10310.0 *23*	3/2$^-$@	T=7/2; Γ_γ=1.22 eV *50*; Γ_p=400 eV *50* Ep=1863.4 *20*.
10317.3 *23*		Γ_γ=0.43 eV *25*; Γ_p=70 eV *30* Ep=1870.9 *20*.
10319.8 *23*		Γ_γ=0.43 eV *25*; Γ_p=130 eV *30* Ep=1873.5 *20*.
10323.6 *23*		Γ_γ=0.27 eV *15*; Γ_p=50 eV *20* Ep=1877.3 *20*.
10342.0 *23*		Γ_γ=0.34 eV *35*; Γ_p=100 eV *20* Ep=1896.1 *20*.

† E(level)≤2499 from 1971ViZU. Others from Ep in 1975Vi02 and S(p)=8486.2 *12* (2021Wa16).
‡ From the Adopted Levels, except for IAR′s.
# Candidate for anti-IAS, based on the character of the primary gamma B(M1) (1975Vi02).
@ L=1 and primary γ-deexcitation pattern. Component of IAS of 2.02-MeV state in ^{47}Ca.

γ(^{47}Sc)

E_i(level)	J_i^π	E_γ†	I_γ‡	E_f	J_f^π	E_i(level)	J_i^π	E_γ†	I_γ‡	E_f	J_f^π
767	(3/2)$^+$	767	100	0.0	7/2$^-$	2002	3/2$^+$	598	30	1404	5/2$^+$
808	3/2$^-$	808	100	0.0	7/2$^-$			706	20	1296	5/2$^-$
1146	11/2$^-$	1146	100	0.0	7/2$^-$			1194	50	808	3/2$^-$
1296	5/2$^-$	488	8	808	3/2$^-$	2206	(5/2$^-$,7/2$^-$)	1398	50	808	3/2$^-$
		1296	92	0.0	7/2$^-$			2206	50	0.0	7/2$^-$
1390	1/2$^+$	582	85	808	3/2$^-$	2378	5/2$^+$	1611	60	767	(3/2)$^+$
		623	15	767	(3/2)$^+$			2378	40	0.0	7/2$^-$
1404	5/2$^+$	637	20	767	(3/2)$^+$	2409	7/2,9/2	1601	65	808	3/2$^-$
		1404	80	0.0	7/2$^-$			1642	20	767	(3/2)$^+$
1797	3/2,5/2$^-$,7/2$^-$	501	50	1296	5/2$^-$			2409	15	0.0	7/2$^-$
		989	50	808	3/2$^-$	2499	7/2$^-$	2499	100	0.0	7/2$^-$
1878	9/2$^-$	732	30	1146	11/2$^-$	10305.1	(3/2$^-$)	3576	28	6724	
		1878	70	0.0	7/2$^-$			3716	17	6584	

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^{46}Ca(p,p),(p,p′),(p,γ) IAR 1975Vi02,1971ViZU (continued)

γ(^{47}Sc) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π
10305.1	(3/2⁻)	3917	20	6383	
		4700	19	5600	
		4791	12	5509	
		5149	12	5151	−
		5302	15	4998	
		5344	16	4956	
		5469	5	4831	
		5579	27	4721	
		5610	8	4690	
		5691	18	4609	1/2⁺
		5747	44	4553	3/2⁺,5/2⁺
		5825	6	4475	
		6202	6	4099	
		6216	9	4085	3/2⁻
		6282	12	4019	
		6572	9	3728	
		6724	18	3576	
		7010	11	3290	
		7038	6	3262	
		7095	12	3205	1/2⁻,3/2⁻
		7167	28	3133	−
		7358	15	2941	
		7390	10	2909	
		7464	21	2836	1/2⁻,3/2⁻
		7490	15	2810	1/2⁻,3/2⁻
		8094	12	2206	(5/2⁻,7/2⁻)
		8298	6	2002	3/2⁺
		8502	21	1797	3/2,5/2⁻,7/2⁻
		8895	18	1404	5/2⁺
		8910	10	1390	1/2⁺
		9003	32	1296	5/2⁻
		9491	9	808	3/2⁻
		9532	8	767	(3/2)⁺
		10299	10	0.0	7/2⁻
10307.5	(3/2⁻)	3578	24	6724	
		3718	10	6584	
		3919	58	6383	
		4702	45	5600	
		4793	37	5509	
		5151	48	5151	−
		5304	15	4998	
		5346	23	4956	
		5471	36	4831	
		5500	31	4802	
		5510	38	4792	
		5581	24	4721	
		5612	31	4690	
		5671	18	4631	1/2⁻,3/2⁻
		5693	37	4609	1/2⁺
		5827	10	4475	
		5895	8	4408	
		6204	21	4099	
		6218	13	4085	3/2⁻
		6284	42	4019	
		6726	15	3576	
		7012	24	3290	
10307.5	(3/2⁻)	7097	28	3205	1/2⁻,3/2⁻
		7169	28	3133	−
		7361	60	2941	
		7393	20	2909	
		7466	16	2836	1/2⁻,3/2⁻
		7492	9	2810	1/2⁻,3/2⁻
		7652	33	2650	
		7774	29	2528	1/2⁺
		7802	18	2499	7/2⁻
		8096	21	2206	(5/2⁻,7/2⁻)
		8300	31	2002	3/2⁺
		8505	96	1797	3/2,5/2⁻,7/2⁻
		8897	23	1404	5/2⁺
		8912	135	1390	1/2⁺
		9005	26	1296	5/2⁻
		9494	67	808	3/2⁻
		9534	21	767	(3/2)⁺
		10301	241	0.0	7/2⁻
10310.0	3/2⁻	3580	26	6724	
		3720	12	6584	
		3921	42	6383	
		4704	48	5600	
		4795	30	5509	
		5153	36	5151	−
		5306	20	4998	
		5348	35	4956	
		5473	21	4831	
		5502	42	4802	
		5512	18	4792	
		5614	22	4690	
		5672	34	4631	1/2⁻,3/2⁻
		5695	26	4609	1/2⁺
		5751	14	4553	3/2⁺,5/2⁺
		5829	6	4475	
		5897	11	4408	
		6206	15	4099	
		6220	31	4085	3/2⁻
		6286	30	4019	
		6577	11	3728	
		6728	20	3576	
		7014	19	3290	
		7042	38	3262	
		7099	9	3205	1/2⁻,3/2⁻
		7171	31	3133	−
		7363	45	2941	
		7395	39	2909	
		7468	30	2836	1/2⁻,3/2⁻
		7494	62	2810	1/2⁻,3/2⁻
		7654	15	2650	
		7776	13	2528	1/2⁺
		7805	20	2499	7/2⁻
		8098	62	2206	(5/2⁻,7/2⁻)
		8302	40	2002	3/2⁺
		8507	27	1797	3/2,5/2⁻,7/2⁻
		8900	31	1404	5/2⁺
		8914	74	1390	1/2⁺

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^{46}Ca(p,p),(p,p′),(p,γ) IAR 1975Vi02,1971ViZU (continued)

γ(^{47}Sc) (continued)

E_i(level)	E_γ[†]	I_γ[‡]	E_f	J^π_f
10310.0	9008	67	1296	$5/2^-$
	9496	73	808	$3/2^-$
	9537	35	767	$(3/2)^+$
	10303	49	0.0	$7/2^-$

[†] Calculated by the evaluators from the level scheme.

[‡] Photon branching ratio (in percent) from each bound state (1971ViZU); weak transitions (≤5%) not reported by authors. Γ_γ (meV) for primary γ′s (1975Vi02); ΔIγ≈20% for strong transitions to ≈40% for weak lines.

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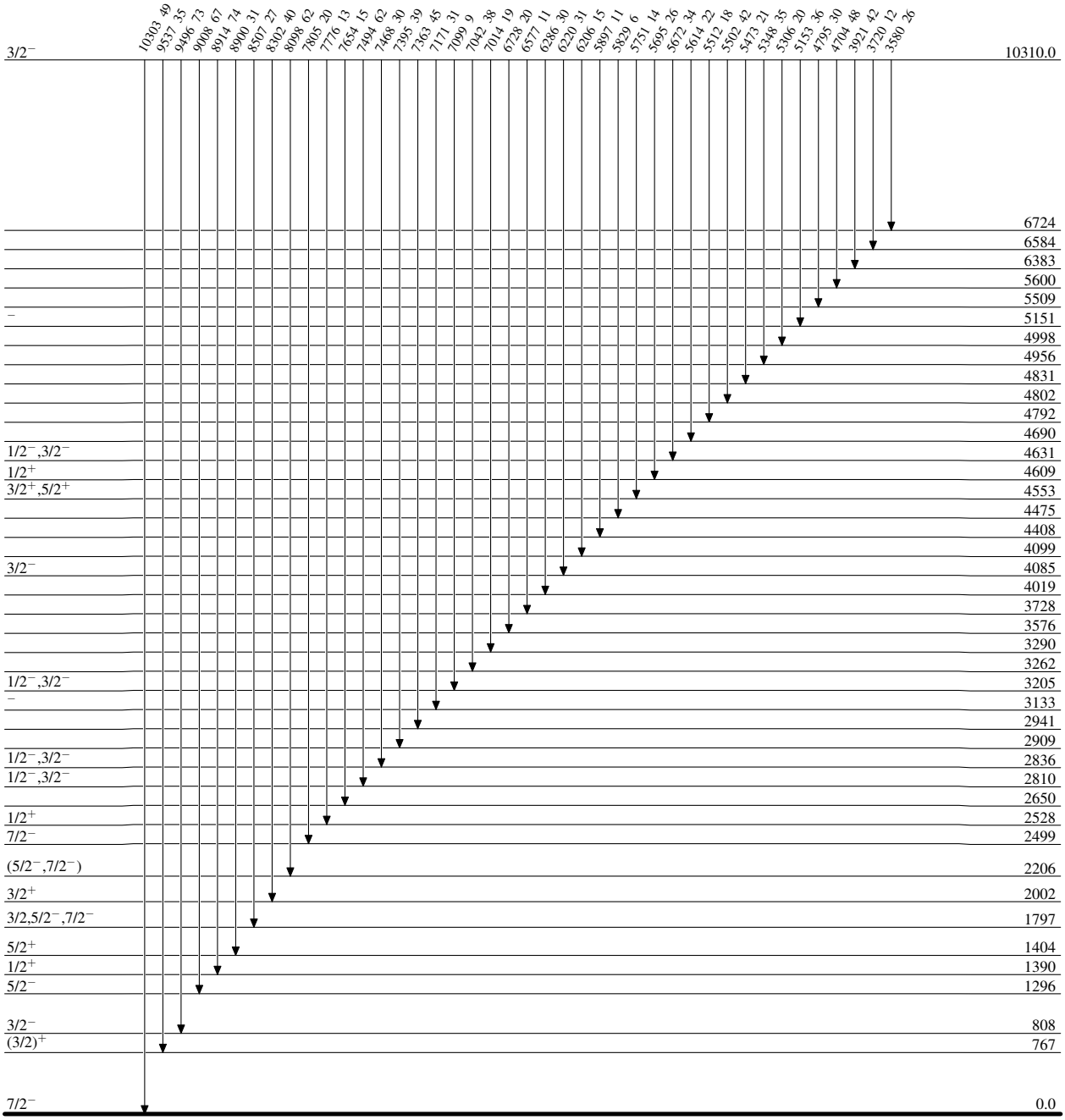
Level Scheme

Intensities: % photon branching from each level

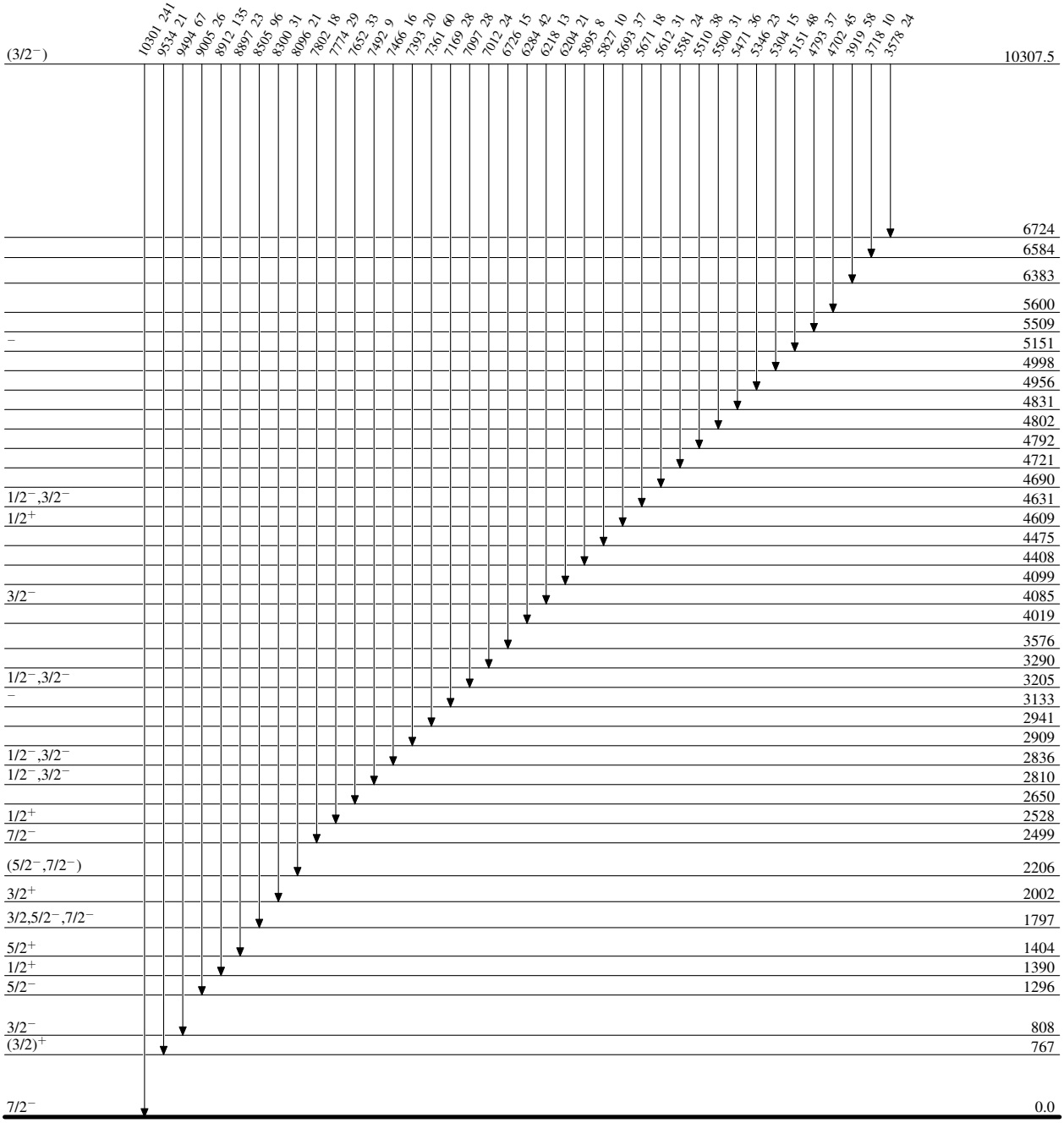


$^{47}_{21}Sc_{26}$

^{46}Ca(p,p),(p,p′),(p,γ) IAR 1975Vi02,1971ViZU

Level Scheme (continued)

Intensities: % photon branching from each level

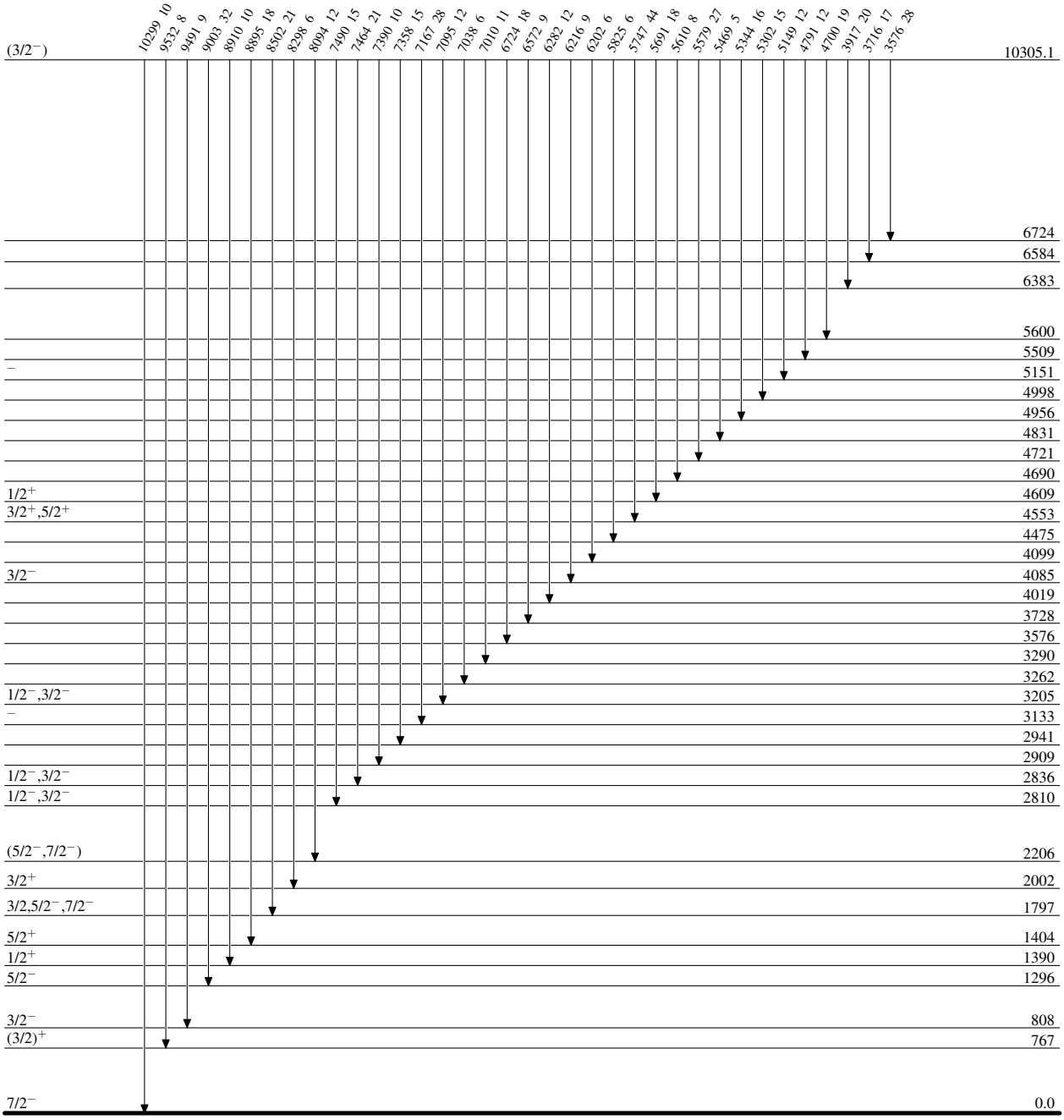


$^{47}_{21}Sc_{26}$

^{46}Ca(p,p),(p,p′),(p,γ) IAR 1975Vi02,1971ViZU

Level Scheme (continued)

Intensities: % photon branching from each level

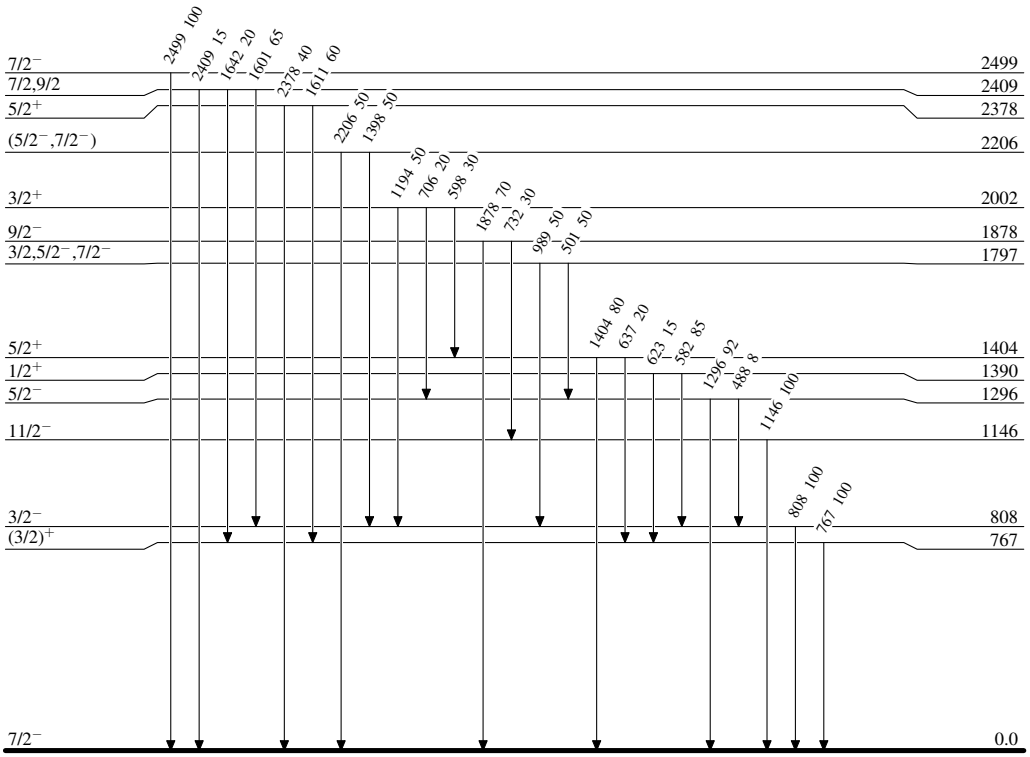


$^{47}_{21}Sc_{26}$

^{46}Ca(p,p),(p,p′),(p,γ) IAR 1975Vi02,1971ViZU

Level Scheme (continued)

Intensities: % photon branching from each level



$^{47}_{21}Sc_{26}$