

⁷⁰Ge(p,γ) 1975Li14

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 188,1 (2023)	17-Jan-2023

1975Li14: E=1.0-2.5 MeV proton beams from the 3-MeV Van de Graaff accelerator at the Tsing Hua University. Measured E_γ, I_γ, excitation function with NaI(Tl), γ singles with Ge(Li), γγ-coin with NaI(Tl)-Ge(Li) detectors. Deduced levels.

Other: **1973Hs02.**

The level scheme of ⁷¹As is based on measurements of deexcitation γ rays at E(p)=2.434 and 2.030 MeV. **1975Li14** state that they observed 149 proton resonances in the energy 976 to 2466 keV, but only 21 were shown in a spectral figure in the energy range 1382 to 2461 keV.

⁷¹As Levels

E(level) [†]	J ^{π‡}	Comments
0	5/2 ⁻	
145 2		J ^π : there are two levels at 143.49 7 with J ^π =(1/2) ⁻ and 147.41 4 with J ^π =3/2 ⁻ in Adopted Levels.
510 2	(3/2) ⁻	
829 2	(3/2) ⁻	
870 2	(5/2) ⁻	J ^π : (3/2 ⁻ ,5/2 ⁻) suggested by 1975Li14 .
924 2	(7/2) ⁻	
991 2	(3/2,5/2) ⁻	J ^π : (1/2,3/2) suggested by 1975Li14 .
1007 3	1/2 ⁻ ,3/2 ⁻	J ^π : (1/2,3/2) suggested by 1975Li14 .
1243 4	(3/2 ⁻ ,5/2 ⁻)	J ^π : (3/2 ⁻ ,5/2 ⁻) suggested by 1975Li14 .
1410 4	1/2 ⁻ ,3/2 ⁻	
1467 4		
1490 5		J ^π : (1/2,3/2) suggested by 1975Li14 .
1533 5	1/2 ⁺	
1609 5	1/2 ⁻ ,3/2 ⁻	J ^π : (1/2,3/2) suggested by 1975Li14 .
1974 5	7/2 ⁺ ,9/2 ⁺	
2360 5		
2488 5		
2657 5	3/2 ⁺ ,5/2 ⁺	
2947 5		
5982 5		E(p)(lab)=1382 keV.
6015 5		E(p)(lab)=1414 keV.
6150 5		E(p)(lab)=1552 keV.
6270 5		E(p)(lab)=1674 keV.
6393 5		E(p)(lab)=1798 keV.
6479 5		E(p)(lab)=1886 keV.
6506 5		E(p)(lab)=1913 keV.
6546 5		E(p)(lab)=1954 keV.
6587 5		E(p)(lab)=1995 keV.
6606 5		E(p)(lab)=2014 keV.
6621 5		E(p)(lab)=2030 keV.
6669 5		E(p)(lab)=2078 keV.
6762 5		E(p)(lab)=2173 keV.
6824 5		E(p)(lab)=2235 keV.
6867 5		E(p)(lab)=2279 keV.
6889 5		E(p)(lab)=2301 keV.
6922 5		E(p)(lab)=2335 keV.
6984 5		E(p)(lab)=2398 keV.
7000 5		E(p)(lab)=2414 keV.
7020 5		E(p)(lab)=2434 keV.
7046 5		E(p)(lab)=2461 keV.

[†] S(p)+E(p)(c.m.), where S(p)=4620 4 (**2021Wa16**).

[‡] From the Adopted Levels.

$^{70}\text{Ge}(p,\gamma)$ **1975Li14** (continued)

$\gamma(^{71}\text{As})$

$E_i(\text{level})$	J_i^π	E_γ^{\ddagger}	$I_\gamma^{\textcircled{a}}$	E_f	J_f^π
145		145 2		0	5/2 ⁻
510	(3/2) ⁻	510 [#] 2		0	5/2 ⁻
829	(3/2) ⁻	319 3		510	(3/2) ⁻
		684 3		145	
		829 2		0	5/2 ⁻
870	(5/2) ⁻	360 [#] 3		510	(3/2) ⁻
		725 3		145	
		870 2		0	5/2 ⁻
924	(7/2) ⁻	414 3		510	(3/2) ⁻
		779 3		145	
		924 2		0	5/2 ⁻
991	(3/2,5/2) ⁻	481 3		510	(3/2) ⁻
		846 3		145	
		991 2		0	5/2 ⁻
1243	(3/2 ⁻ ,5/2 ⁻)	373 4		870	(5/2) ⁻
		1098 4		145	
		1243 4		0	5/2 ⁻
1410	1/2 ⁻ ,3/2 ⁻	1265 4		145	
1490		980 5		510	(3/2) ⁻
1533	1/2 ⁺	1388 5		145	
6621		3674 7	4.2	2947	
		3964 7	4.5	2657	3/2 ⁺ ,5/2 ⁺
		4133 7	1.0	2488	
		4261 7	4.3	2360	
		4647 7	2.2	1974	7/2 ⁺ ,9/2 ⁺
		5012 7	5.7	1609	1/2 ⁻ ,3/2 ⁻
		5088 7	2.5	1533	1/2 ⁺
		5131 7	7.1	1490	
		5154 6	1.0	1467	
		5211 6	6.4	1410	1/2 ⁻ ,3/2 ⁻
		5378 6	4.4	1243	(3/2 ⁻ ,5/2 ⁻)
		5614 6	5.6	1007	1/2 ⁻ ,3/2 ⁻
		5630 5	7.7	991	(3/2,5/2) ⁻
		5697 5	3.5	924	(7/2) ⁻
		5751 5	5.1	870	(5/2) ⁻
		5792 5	5.0	829	(3/2) ⁻
		6111 5	5.7	510	(3/2) ⁻
		6476 5	23.1	145	
		6621 5	1.0	0	5/2 ⁻
7020		4071 7	4.8	2947	
		4361 7	4.1	2657	3/2 ⁺ ,5/2 ⁺
		4530 7	1.0	2488	
		4658 7	4.2	2360	
		5044 7	3.4	1974	7/2 ⁺ ,9/2 ⁺
		5409 7	5.8	1609	1/2 ⁻ ,3/2 ⁻
		5485 7	1.0	1533	1/2 ⁺
		5528 7	5.0	1490	
		5551 6	3.5	1467	
		5608 6	5.3	1410	1/2 ⁻ ,3/2 ⁻
		5775 6	4.4	1243	(3/2 ⁻ ,5/2 ⁻)
		6011 6	6.9	1007	1/2 ⁻ ,3/2 ⁻
		6027 5	8.8	991	(3/2,5/2) ⁻
		6094 5	4.7	924	(7/2) ⁻
		6148 5	6.2	870	(5/2) ⁻
		6189 5	4.7	829	(3/2) ⁻

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$^{70}\text{Ge}(\text{p},\gamma)$ 1975Li14 (continued) $\gamma(^{71}\text{As})$ (continued)

<u>$E_i(\text{level})$</u>	<u>J_i^π</u>	<u>E_γ</u> ^{†‡}	<u>I_γ</u> [@]	<u>E_f</u>	<u>J_f^π</u>
7020		6508 5	5.5	510	(3/2) ⁻
		6872 5	17.4	145	
		7018 5	3.3	0	5/2 ⁻

† Primary γ rays for $E(\text{p})=2.03$ MeV have been observed by 1975Li14, but the energies have not been given. These were derived from the measured Q value of 4619 5, the incident proton energy and the level energies populated by the γ rays.

‡ Uncertainties of the primary and secondary γ rays have not been given by 1975Li14 and have been estimated from Q value and level energies.

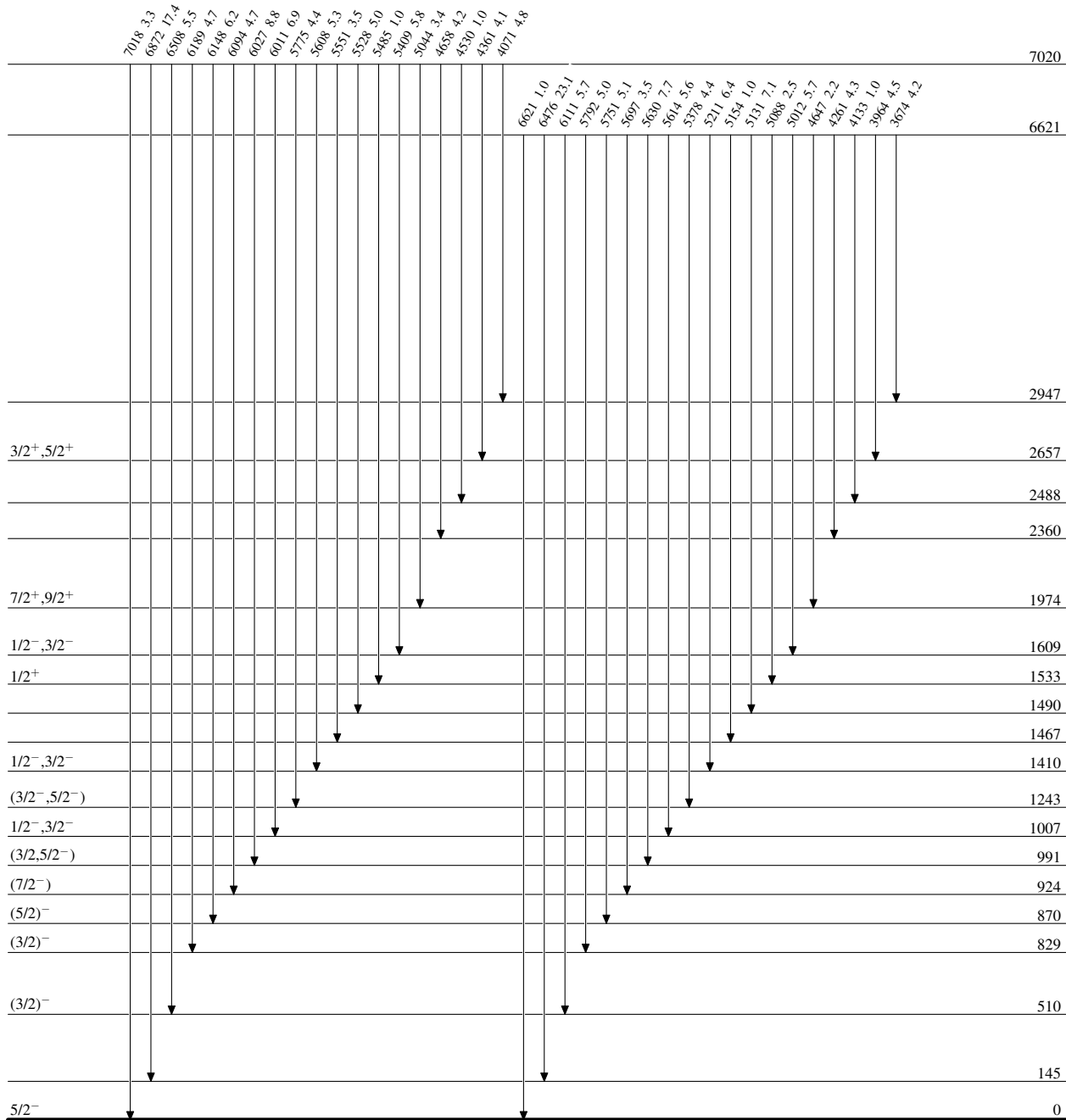
510 γ is mixed with a strong 511-annihilation radiation line in spectra Fig. 4 of 1975Li14. Most likely, 510 level corresponds to the 506.18 level in the Adopted Levels, where the γ -ray data have been taken from ^{71}Se ε decay. No 510 γ was reported in ^{71}Se decay. Rather the main γ ray from the 506 level is 358.8 keV, which could correspond to the strong 360-keV γ in spectral Fig. 4. 1975Li14 placed 360 γ from 870-keV level, whereas 358.8 γ was placed only from the 506 level in ^{71}Se decay. The 510 γ is not included in the Adopted Levels, Gammas, and the 360 γ is placed from only the 506 level in the Adopted dataset.

@ Relative photon branching for γ rays from the 6621 and 7020 resonances are given.

$^{70}\text{Ge}(p,\gamma)$ **1975Li14**

Level Scheme

Intensities: % photon branching from each level

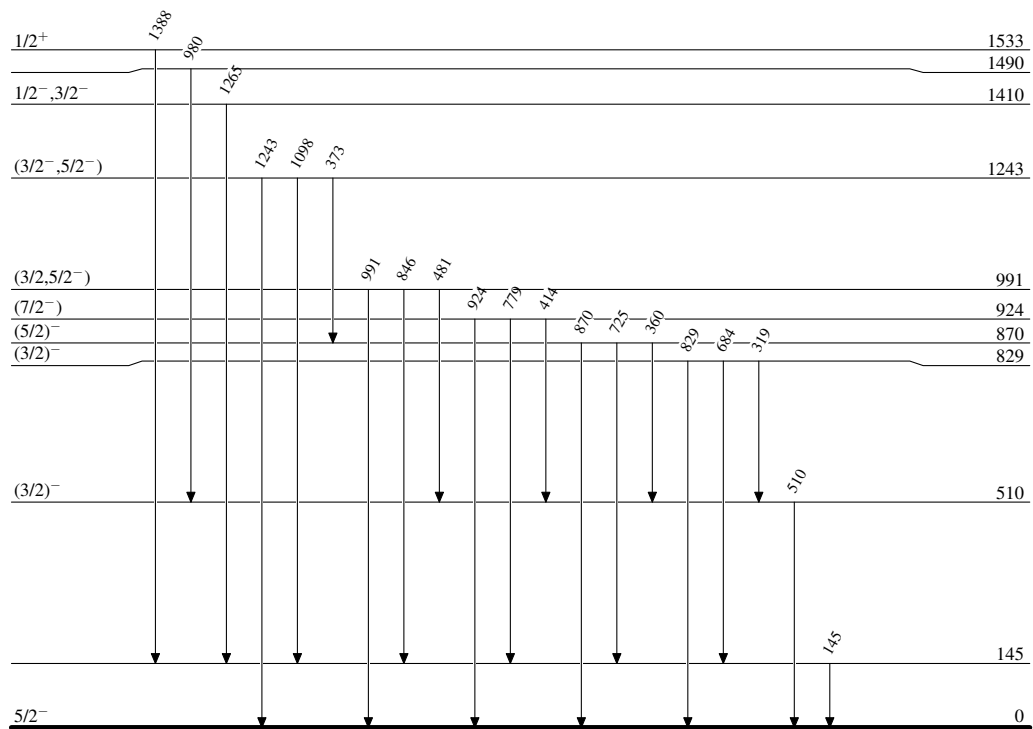


$^{71}_{33}\text{As}_{38}$

${}^{70}\text{Ge}(p,\gamma)$ 1975Li14

Level Scheme (continued)

Intensities: % photon branching from each level

 ${}^{71}_{33}\text{As}_{38}$