^{208}Pb(^{36}S,^{35}Sγ) 2010WaZT,2022Gr07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Lijie Sun and Jun Chen	NDS 211,1 (2026)	30-Sep-2025

2022Gr07: A 215-MeV ^{36}S beam was produced from the XTU-Tandem ALPI-superconducting linear accelerator complex at the INFN Legnaro National Laboratory, Italy. The target was 1 mg/cm^2 99.7% enriched ^{208}Pb with 1 mg/cm^2 Nb backing and mounted onto the Cologne differential plunger. Projectile-like fragments produced in binary grazing reactions were separated and identified by the PRISMA spectrometer. γ rays were detected using the AGATA demonstrator array of five triple cluster modules of 36-fold segmented Ge crystals covering backward angles from 135° to 175°. Measured Eγ with Doppler corrections, (^{35}S)γ-coin, and level lifetimes using the differential recoil-distance method (DRDM). Compared with shell-model calculations. Measured Eγ, Iγ, fragment-γ-coin, recoil distance. Deduced levels, lifetimes. Compared with shell-model calculations with PSDPF, SDPF-U, and FSU effective interactions.

2010WaZT,2010Wa12: A 215-MeV ^{36}S^{9} beam was produced from the XTU-Tandem ALPI-superconducting linear accelerator complex at the INFN Legnaro National Laboratory, Italy. The target was 300 μg/cm^2 99.7% enriched ^{208}Pb with 20 μg/cm^2 carbon backing. Projectile-like fragments produced in binary grazing reactions were separated and identified by the PRISMA spectrometer. γ rays were detected using the CLARA array of 22 escape-suppressed Ge clover detectors covering the azimuthal angles from 98° to 180°. Measured Eγ with Doppler corrections, Iγ, and (^{35}S)γ-coin. Deduced levels. Compared with shell-model calculations.

2010WaZT states that the observed γ-ray transitions are consistent with previous published work and no attempt has been made here to construct an independent level scheme.

^{35}S Levels

E(level)[†][‡]	J$^\pi$[#]	T$_{1/2}$	Comments
0	3/2$^+$		2022Gr07 shell-model calculated configuration: $\pi(1d_{5/2})^6(2s_{1/2})^2\otimes\nu(1d_{5/2})^6(2s_{1/2})^2(1d_{3/2})^3$ (77%).
1572.0 *9*	1/2$^+$	2.29 ps *14*	2022Gr07 shell-model calculated configuration: $\pi(1d_{5/2})^6(2s_{1/2})^2\otimes\nu(1d_{5/2})^6(2s_{1/2})^1(1d_{3/2})^4$ (44%). T$_{1/2}$: Lifetime=3.3 ps *2* from 2022Gr07 using the recoil-distance method with decay-curve analysis.
1991.1 *9*	7/2$^-$		
2347.1 *13*	3/2$^-$		
2717.1 *14*	5/2$^+$		
3421 *2*	5/2$^+$		
3558.1 *14*	(5/2$^+$)		
3593 *2*	(7/2$^+$)		
3818.1 *14*	(9/2)$^-$		
4023.1 *22*	(11/2)$^-$		

[†] Additional information 1.
[‡] From a least-squares fit to γ-ray energies.
[#] From the Adopted Levels.

γ(^{35}S)

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
370 *1*	3.2 *6*	2717.1	5/2$^+$	2347.1	3/2$^-$	
1211[‡] *2*	1.7 *7*	3558.1	(5/2$^+$)	2347.1	3/2$^-$	
[x]1227 *1*	5.2 *9*					
1567[‡] *2*	9.6 *9*	3558.1	(5/2$^+$)	1991.1	7/2$^-$	
1572 *1*	100.0 *24*	1572.0	1/2$^+$	0	3/2$^+$	2022Gr07 shell-model calculated B(E2; 1/2$^+$ to 3/2$^+$) = 35.2 e^2 fm^4 (5.2 W.u.), B(M1; 1/2$^+$ to 3/2$^+$) = 0.0204 μ_N^2 (1.14×10^{-2} W.u.), and mixing ratio [δ^2 = λ(E2)/λ(M1)] = 0.30.

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$\gamma(^{35}S)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
1827 *1*	12.9 *11*	3818.1	$(9/2)^-$	1991.1	$7/2^-$	2717 *2*	14.5 *15*	2717.1	$5/2^+$	0	$3/2^+$
1986‡ *2*	3.7 *6*	3558.1	$(5/2^+)$	1572.0	$1/2^+$	[x]3034 *3*	7.2 *9*				
1991 *1*	37.2 *18*	1991.1	$7/2^-$	0	$3/2^+$	3421 *2*	8.6 *10*	3421	$5/2^+$	0	$3/2^+$
2032 *2*	13.1 *12*	4023.1	$(11/2)^-$	1991.1	$7/2^-$	3593 *2*	8.8 *11*	3593	$(7/2^+)$	0	$3/2^+$
2347 *2*	6.5 *9*	2347.1	$3/2^-$	0	$3/2^+$						

† From 2010WaZT.
‡ Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

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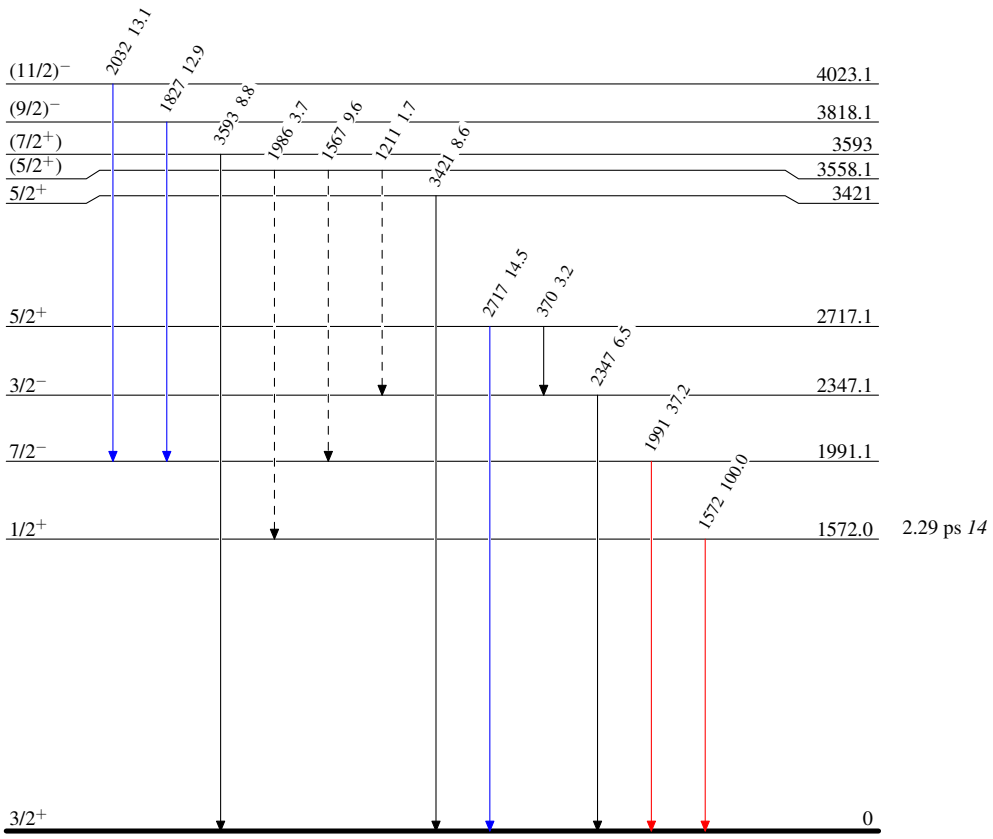
Level Scheme

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



$^{35}_{16}S_{19}$