^{28}Si(^{32}S,αpnγ) 2010Ru10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yang Dong, Huo Junde	NDS 121, 1 (2014)	20-Jun-2014

E(^{32}S)=130 MeV beam bombarded enriched 0.5 mg/cm^2 targets. Measured: Eγ, Iγ, $\gamma\gamma$-coin, γn-coin, $\alpha\gamma$-coin, pγ-coin, $\gamma\gamma(\theta)$ with the Gammasphere, at LBNL, comprised of 78 Ge detectors, neutron shell consisting of 30 liquid-scintillators replaced the five most forward rings of the gammasphere for the detection of neutrons, and 4πi CsI(Tl)-array Microball used to detect light charged particles; calculations and analysis with spherical shell model (ANTOINE code), Cranked Nilsson Strutinsky (CNS) and ULTIMATE CRANKER (UC).

^{54}Co Levels

E(level)[†]	J$^\pi$	Comments
0.0	0$^+$	
197.0[#] *4*	7$^+$	
937.0 *8*	1$^+$[‡]	
1446.0 *8*	2$^+$[‡]	
1614.0 *13*	1$^+$[‡]	
1822.2 *11*	3$^+$[‡]	T=0
1887.2 *12*	5$^+$[‡]	T=0
2082.8 *12*	(5$^+$)[‡]	T=0
2174.0 *11*	3$^+$	
2289.8 *12*	(3)[‡]	
2652.2 *13*	4$^+$[‡]	T=1
2851.7? *13*	4$^+$[‡]	T=0
2915.8 *16*		
2979 *5*		E(level): expected to be the T=1,6$^+$, 1f$^{-2}_{7/2}$ isobaric triplet state of α=54.
3170.5[#] *17*	9$^+$	
3266.6? *14*		
3326 *2*		
3363.5[#] *18*	8$^+$	
3794 *5*		
4727.5[#] *19*	11$^+$	
5046.5[#] *18*	10$^+$	
5358.3 *19*	10$^+$	
6897 *4*	(11$^+$)	
7241.6[#] *22*	(12$^+$)	
7454 *3*		
8332 *3*	(12$^+$)	
8418[#] *3*	13$^+$	
8824 *4*		
9688[@] *3*	(13$^+$)	
9994[@] *5*	(13$^+$)	
10252[@] *6*		J$^\pi$: 13$^+$ predicted in shell-model calculations.
10486[#] *3*	(14$^+$)	
10507[@] *8*		

[†] From least-squares fit to Eγ's.
[‡] From or consistent with the assignment in adopted Levels.
[#] Band(A): Yrast sequence.
[@] Band(B): Yrare sequence. Yrare sequence is found to feed the 11$^+$ state at 4728 keV of the yrast sequence.

^{28}Si(^{32}S,αpnγ) 2010Ru10 (continued)

γ(^{54}Co)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
193 *1*	1 *1*	3363.5	8^+	3170.5	9^+		
195 *1*	0.9 *3*	2082.8	(5^+)	1887.2	5^+		
261 *1*	3.0 *4*	2082.8	(5^+)	1822.2	3^+	D+Q	R_{ADO}=0.95 *21*.
376 *1*	11.6 *5*	1822.2	3^+	1446.0	2^+	D	R_{ADO}=0.88 *9*.
509 *1*	18 *1*	1446.0	2^+	937.0	1^+	D	R_{ADO}=0.87 *8*.
560 *1*	2.4[#] *5*	2174.0	3^+	1614.0	1^+		
674 *1*	1.4 *3*	3326		2652.2	4^+		
728 *1*	2.5 *4*	2174.0	3^+	1446.0	2^+		
765 *1*	2.1[#] *5*	2652.2	4^+	1887.2	5^+		
830 *1*	3.7 *8*	2652.2	4^+	1822.2	3^+	D+Q	R_{ADO}=0.99 *23* for doublet.
833 *1*	1.2 *4*	2915.8		2082.8	(5^+)		
844 *1*	3.0 *4*	2289.8	(3)	1446.0	2^+	D+Q	R_{ADO}=1.1 *3*.
937 *1*	20 *2*	937.0	1^+	0.0	0^+	D	R_{ADO}=0.91 *10*.
977[@] *1*	0.9 *2*	3266.6?		2289.8	(3)		
1029[@] *1*	0.7 *2*	2851.7?	4^+	1822.2	3^+		
1183[@] *2*	0.5 *2*	3266.6?		2082.8	(5^+)		
(1237)		2174.0	3^+	937.0	1^+		
1446 *1*	3 *1*	1446.0	2^+	0.0	0^+		
1557 *1*	60 *3*	4727.5	11^+	3170.5	9^+	Q	R_{ADO}=1.25 *9*.
1614 *2*	3[‡] *1*	1614.0	1^+	0.0	0^+		
1683 *1*	3 *1*	5046.5	10^+	3363.5	8^+		
1690 *2*	3[‡] *1*	1887.2	5^+	197.0	7^+		
1876 *1*	7.0 *6*	5046.5	10^+	3170.5	9^+	D+Q	R_{ADO}=1.21 *19*.
1994 *2*	2 *1*	5358.3	10^+	3363.5	8^+		
2068 *1*	2.7 *5*	10486	(14^+)	8418	13^+	(D+Q)	R_{ADO}=0.91 *22*.
2188 *1*	9.5 *8*	5358.3	10^+	3170.5	9^+	D+Q	R_{ADO}=0.48 *11*.
2195 *2*	2 *1*	7241.6	(12^+)	5046.5	10^+		
2407[@] *2*	2 *1*	7454		5046.5	10^+		
2446[@] *2*	1.3 *5*	9688	(13^+)	7241.6	(12^+)		
2514 *2*	14 *2*	7241.6	(12^+)	4727.5	11^+	D+Q	R_{ADO}=0.98 *10*.
2782 *5*	7 *1*	2979		197.0	7^+		
2973[@] *3*	3 *2*	8332	(12^+)	5358.3	10^+		The missing intensity is assumed to be carried by the predicted but unobserved 2973-keV γ-ray.
2974 *2*	100 *4*	3170.5	9^+	197.0	7^+	Q	R_{ADO}=1.30 *12*.
3165 *3*	8 *1*	3363.5	8^+	197.0	7^+	D+Q	R_{ADO}=1.3 *4*.
3245 *3*	3.8 *8*	10486	(14^+)	7241.6	(12^+)	(Q)	R_{ADO}=1.27 *23*.
3285 *3*	3 *1*	8332	(12^+)	5046.5	10^+		
3465 *3*	2.3 *6*	8824		5358.3	10^+		
3597 *5*	3 *1*	3794		197.0	7^+		
3604 *4*	2.5 *4*	8332	(12^+)	4727.5	11^+	(D)	R_{ADO}=0.88 *18*. Mult.: ΔJ=(1) transition.
3690 *3*	12 *1*	8418	13^+	4727.5	11^+	Q	R_{ADO}=1.22 *13*.
3726 *3*	4.6 *7*	6897	(11^+)	3170.5	9^+	(Q)	R_{ADO}=1.6 *6*.
4091 *4*	2 *1*	7454		3363.5	8^+		
4961 *4*	1.9 *4*	9688	(13^+)	4727.5	11^+	(Q)	R_{ADO}=1.4 *5*.
5266 *4*	2.3 *4*	9994	(13^+)	4727.5	11^+	(Q)	R_{ADO}=1.3 *4*.
5524 *5*	0.8 *3*	10252		4727.5	11^+		
5779 *7*	0.3 *1*	10507		4727.5	11^+		

[†] Based on the ratio of γ-ray intensities at 150° and 97° with respect to the incident beam R_{ADO}.
[‡] Estimated from the summed intensity of feeding transitions.

Continued on next page (footnotes at end of table)

^{28}Si(^{32}S,αpnγ) 2010Ru10 (continued)

γ(^{54}Co) (continued)

Derived from the branching ratio listed in Adopted Levels, Gammas.
@ Placement of transition in the level scheme is uncertain.

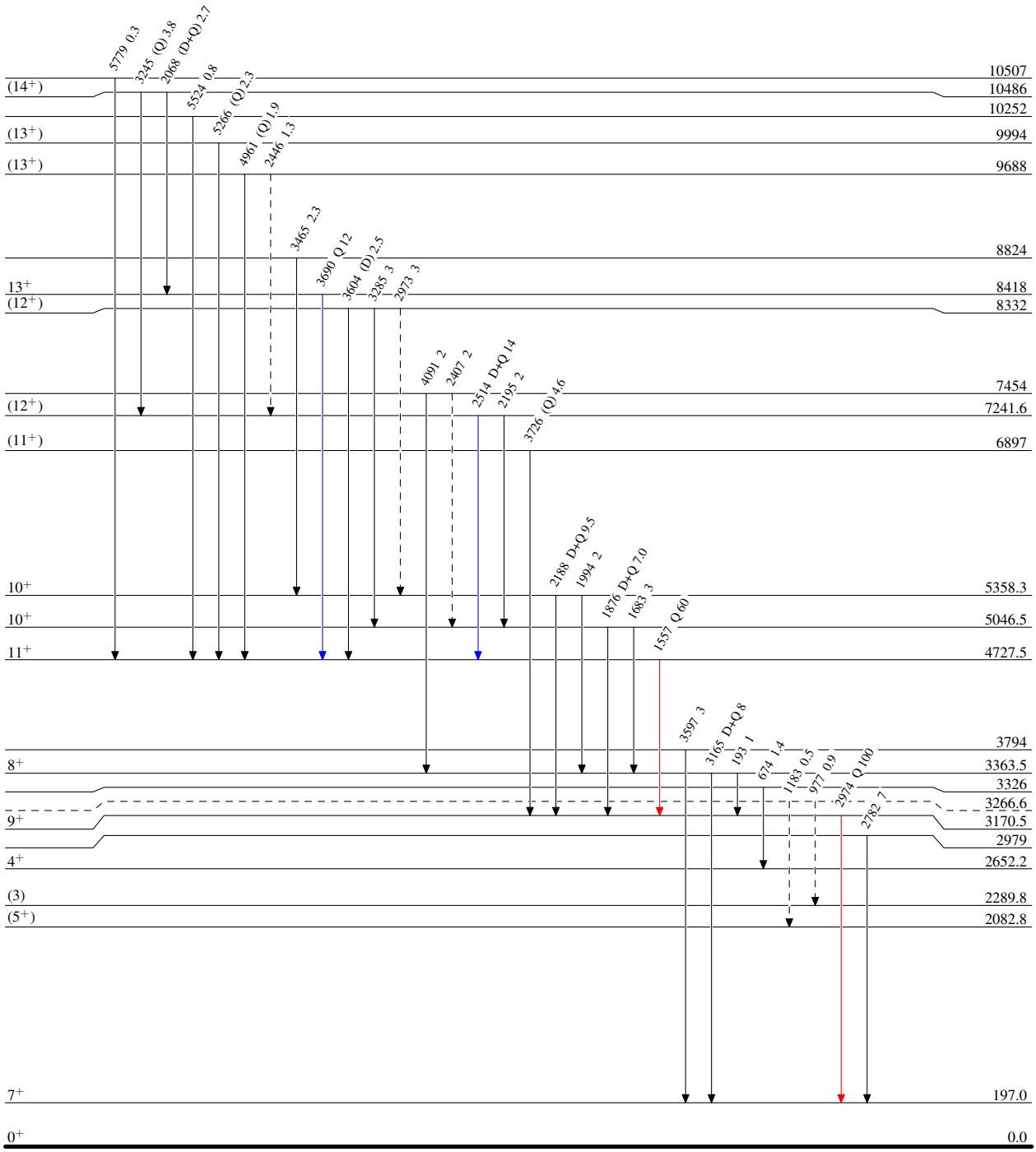
^{28}Si(^{32}S,αpnγ) 2010Ru10

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)



$^{54}_{27}Co_{27}$

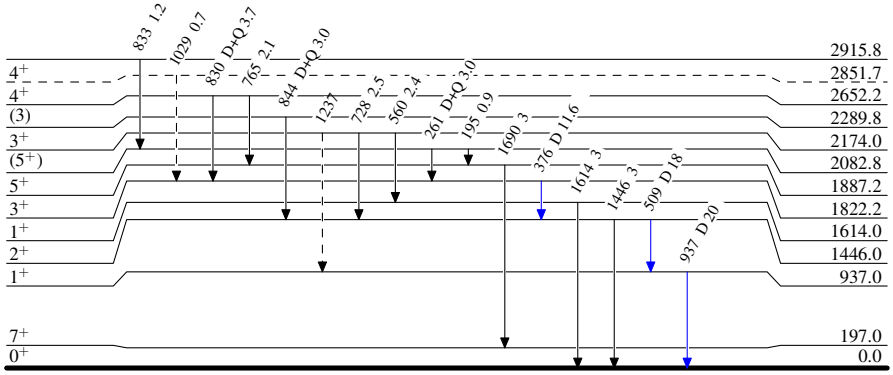
^{28}Si(^{32}S,αpnγ) 2010Ru10

Level Scheme (continued)

Intensities: Relative I_γ

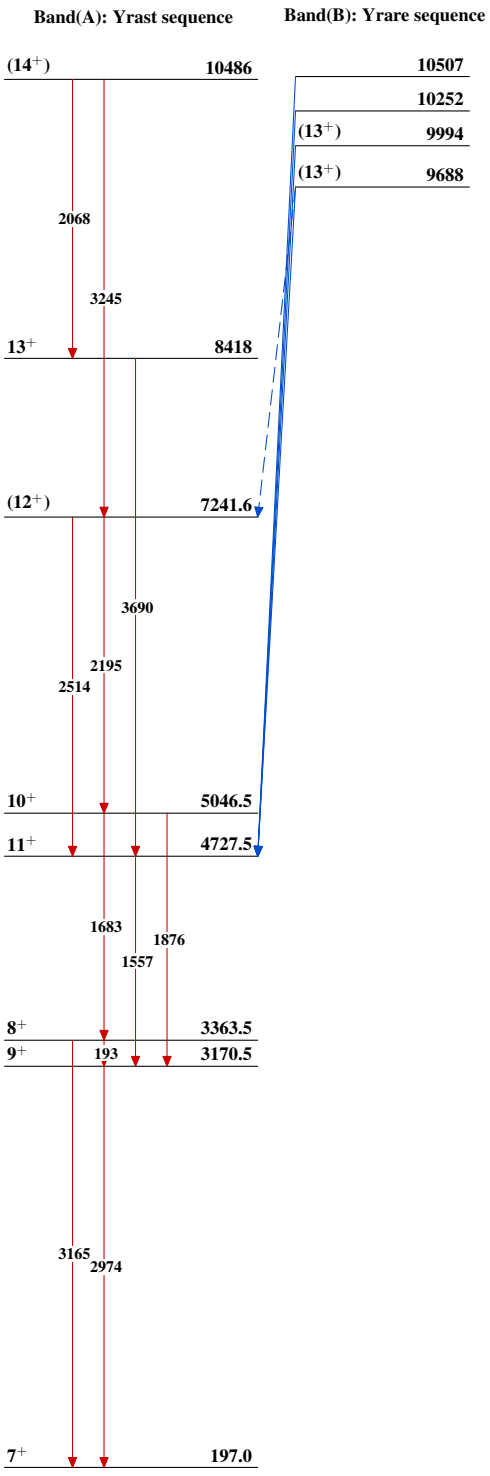
Legend

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



$^{54}_{27}Co_{27}$

$^{28}Si(^{32}S,\alpha pn\gamma)$ 2010Ru10



$^{54}_{27}Co_{27}$