^{9}Be(^{36}S,npγ) 1992Ko15,1998Mo16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

1992Ko15: E=100 MeV ^{36}S beam was produced from the Argonne Tandem Linac Accelerator System (ATLAS). Target of a 2.34 mg/cm^2 thick rolled ^{9}Be foil evaporated onto a 10 mg/cm^2 Pb backing. Charged particles were detected by two Si surface-barrier detector telescopes at forward angles and γ-rays were detected by eight Compton-suppressed Ge detectors (CSGs). Measured Eγ, Iγ, γγ(θ), DCO. Deduced levels, J, π, branching ratios.

1998Mo16: E=90-110 MeV ^{36}S beam was produced from the TANDEM accelerator of the University and Technical University Munich and impinged on beryllium targets. Recoils were identified by the Munich high-frequency recoil spectrometer and detected in ionization chamber. γ-rays were detected by an annular Compton-suppressed HPGe detector positioned at 180° relative to the beam direction, FWHM=2.8 keV at 1.3 MeV. Measured Eγ, Iγ, γγ(θ), pγ-coin, (recoil)γ-coin. Deduced levels, branching ratios. Comparisons with shell-model calculations.

^{43}K Levels

E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†
0	3/2$^+$	1206.97 *7*	(5/2,7/2)$^+$	2081.0 *4*	(5/2,7/2)$^+$	3591.90[a] *8*	(15/2$^+$)[#]
561.13[a] *4*	1/2$^+$	1510.07[a] *7*	7/2$^+$	2508.84[a] *7*	(11/2$^+$)[#]	3985.69 *24*	
738.28[b] *5*	7/2$^-$	1850.43[b] *7*	11/2$^-$‡	2987.26 *17*	(13/2$^-$)[@]	4540.9 *3*	
975.09 *4*	3/2$^-$	1986.66 *10*	(9/2)[#]	3115.53[b] *10*	15/2$^-$‡	4931.2 *3*	(19/2$^-$)[&]
1109.83 *6*	3/2$^+$	2048.89 *7*	(9/2)[#]	3140.04 *8*	(13/2)[#]		

† From Adopted Levels unless otherwise noted.
‡ From ΔJ=2 transitions indicated by R_{DCO} (1992Ko15).
# From ΔJ=1 transitions indicated by R_{DCO} (1992Ko15).
@ Probably high spin formed in coupling an $f_{7/2}$ proton with four $f_{7/2}$ neutrons in a 4$^+$ configuration (1992Ko15).
& Comparison with negative-parity levels of ^{45}Sc suggests that the 1816 keV transition corresponds to the decay of a 19/2$^-$ level to the 15/2$^-$ level at 3116 keV (1998Mo16).
a Band(A): Possible positive-parity yrast band (1992Ko15).
b Band(B): Possible negative-parity yrast band (1992Ko15).

γ(^{43}K)

Unplaced γ-rays from 1998Mo16.
DCO ratios measured as I(90°)/I(147°), statistical uncertainties only (1992Ko15). 1.2-1.4 for stretched dipole and 0.8-0.9 for stretched quadrupole.

E_γ†	I_γ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.&	δ&	Comments
303.10 *5*	4.42 *14*	1510.07	7/2$^+$	1206.97	(5/2,7/2)$^+$			
413.97[#] *5*	0.58[#] *7*	975.09	3/2$^-$	561.13	1/2$^+$			
451.82 *4*	7.7 *2*	3591.90	(15/2$^+$)	3140.04	(13/2)	D+Q	−0.2	R_{DCO}=0.89 *5* gated on 3140 to 1850 transition; 1.06 *12* gated on 3140 to 2509 transition.
459.93 *4*	21.2 *6*	2508.84	(11/2$^+$)	2048.89	(9/2)	D+Q	−0.2	R_{DCO}=0.92 *3* gated on 2049 to 738 transition.
476.4[#] *3*	1.2[#] *5*	3591.90	(15/2$^+$)	3115.53	15/2$^-$	D		R_{DCO}=0.77 *10* gated on 3116 to 1850 transition.
476.58 *6*	5.2 *3*	1986.66	(9/2)	1510.07	7/2$^+$	D		R_{DCO}=1.31 *9* gated on 1510 g.s. transition.
478.39 *16*	2.36 *10*	2987.26	(13/2$^-$)	2508.84	(11/2$^+$)			R_{DCO}=1.04 *11* gated on 2509 to 1510

Continued on next page (footnotes at end of table)

^{9}Be(^{36}S,npγ) 1992Ko15,1998Mo16 (continued)

γ(^{43}K) (continued)

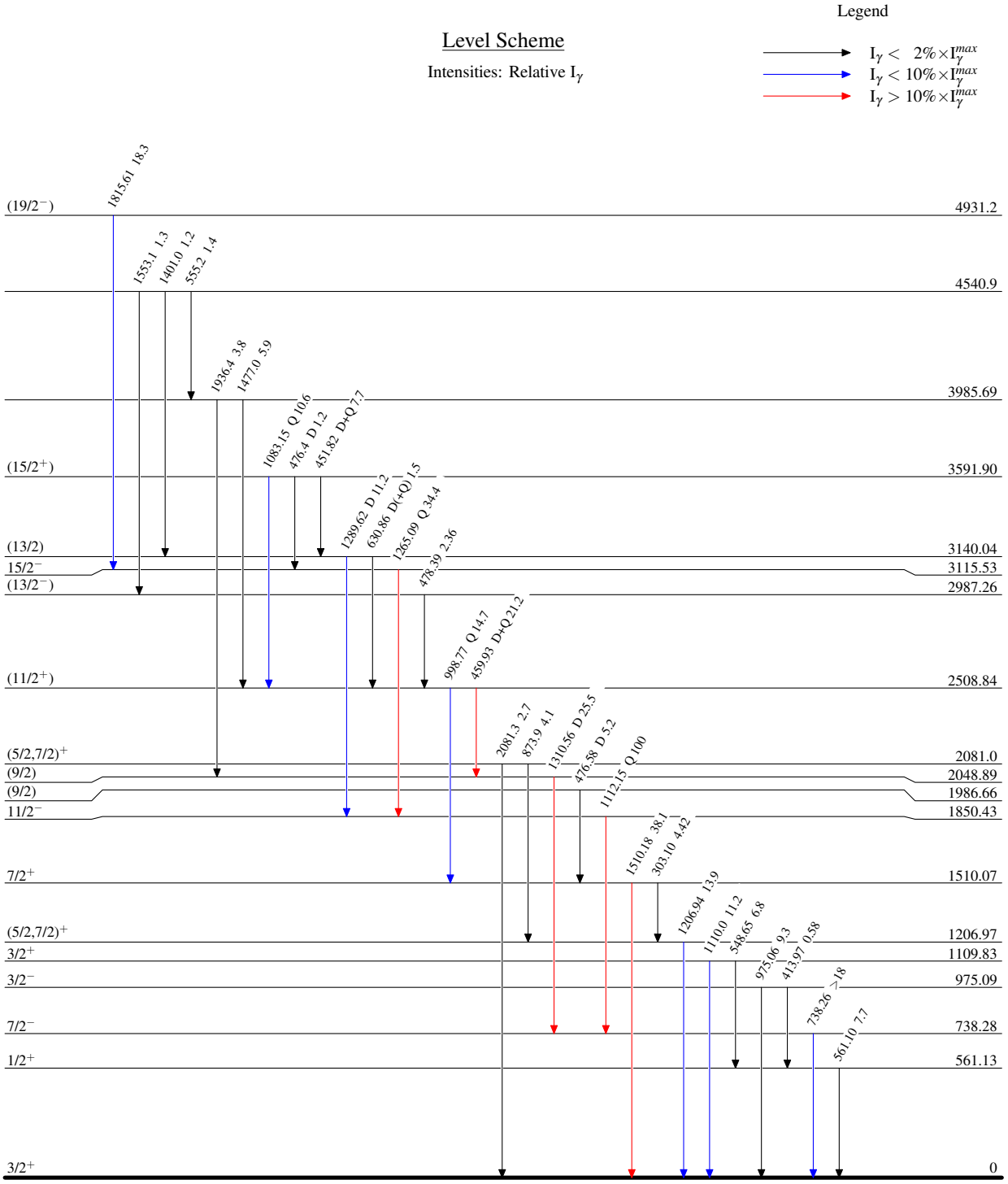
E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
							transition; 0.90 *3* gated on 2509 to 2049 transition.
[x]540.7 *4*	4.6 *13*						
[x]543.1 *5*	4.0 *13*						
548.65[#] *5*	6.8[#] *3*	1109.83	3/2$^+$	561.13	1/2$^+$		
555.2[@] *3*	1.4[@] *3*	4540.9		3985.69			
561.10 *5*	7.7 *6*	561.13	1/2$^+$	0	3/2$^+$		
630.86[#] *12*	1.5[#] *2*	3140.04	(13/2)	2508.84	(11/2$^+$)	D(+Q)	R_{DCO}=1.42 *22* gated on 2509 to 1510 transition; 1.32 *3* gated on 2509 to 2049 transition.
738.26 *5*	>18	738.28	7/2$^-$	0	3/2$^+$		I_γ: the decaying state is a long-lived state and most γ transitions from this state were outside the coincidence window (1992Ko15). It is greater than 100 from intensity balance.
873.9[@] *4*	4.1[@] *10*	2081.0	(5/2,7/2)$^+$	1206.97	(5/2,7/2)$^+$		
975.06 *5*	9.3 *3*	975.09	3/2$^-$	0	3/2$^+$		
998.77 *8*	14.7 *8*	2508.84	(11/2$^+$)	1510.07	7/2$^+$	Q	R_{DCO}=0.72 *5* gated on 1510 g.s. transition.
1083.15 *7*	10.6 *12*	3591.90	(15/2$^+$)	2508.84	(11/2$^+$)	Q	R_{DCO}=0.64 *7* gated on 2509 to 1510 transition.
1110.0 *1*	11.2 *22*	1109.83	3/2$^+$	0	3/2$^+$		
1112.15 *6*	100 *3*	1850.43	11/2$^-$	738.28	7/2$^-$	Q	R_{DCO}=0.77 *3* gated on 738 g.s. transition.
1206.94 *9*	13.9 *4*	1206.97	(5/2,7/2)$^+$	0	3/2$^+$		
1265.09 *7*	34.4 *11*	3115.53	15/2$^-$	1850.43	11/2$^-$	Q	R_{DCO}=0.93 *4* gated on 1850 to 738 transition.
1289.62 *8*	11.2 *13*	3140.04	(13/2)	1850.43	11/2$^-$	D	R_{DCO}=1.5 *1* gated on 1850 to 738 transition.
1310.56 *7*	25.5 *7*	2048.89	(9/2)	738.28	7/2$^-$	D	R_{DCO}=1.22 *10* gated on 738 g.s. transition.
1401.0[@] *5*	1.2[@] *3*	4540.9		3140.04	(13/2)		
1477.0[@] *3*	5.9[@] *12*	3985.69		2508.84	(11/2$^+$)		
1510.18 *18*	38.1 *12*	1510.07	7/2$^+$	0	3/2$^+$		
1553.1[@] *6*	1.3[@] *3*	4540.9		2987.26	(13/2$^-$)		
[x]1798.5 *4*	4.5 *12*						
[x]1810.0 *6*	4.5 *13*						
1815.61[@] *26*	18.3[@] *27*	4931.2	(19/2$^-$)	3115.53	15/2$^-$		
1936.4[@] *5*	3.8[@] *10*	3985.69		2048.89	(9/2)		
2081.3[@] *7*	2.7[@] *9*	2081.0	(5/2,7/2)$^+$	0	3/2$^+$		
[x]2124.9 *4*	7.0 *14*						
[x]2219.8 *6*	4.0 *10*						
[x]2442.3 *6*	2.9 *10*						
[x]2521.6 *5*	4.3 *11*						

[†] Weighted average from 1992Ko15 and 1998Mo16 unless otherwise noted.
[‡] Weighted or unweighted average from 1992Ko15 and 1998Mo16 unless otherwise noted.
[#] From 1992Ko15 only.
[@] From 1998Mo16 only.
[&] From 1992Ko15.
[x] γ ray not placed in level scheme.

^{9}Be(^{36}S,npγ) 1992Ko15,1998Mo16

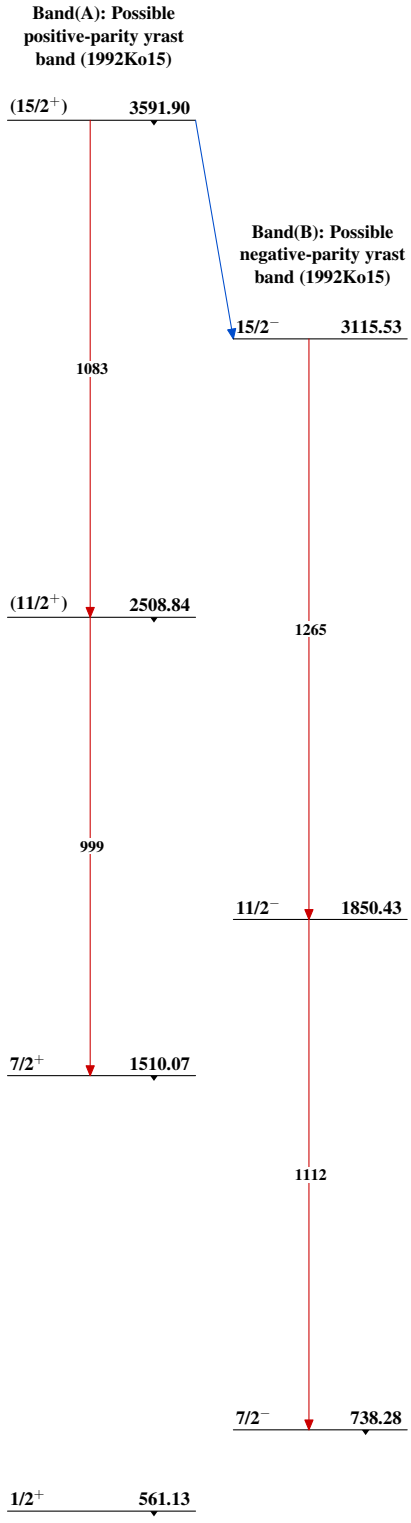
Level Scheme

Intensities: Relative I_γ



$^{43}_{19}K_{24}$

^{9}Be(^{36}S,npγ) 1992Ko15,1998Mo16



$^{43}_{19}K_{24}$