Be(^{31}Mg,^{30}Naγ) 2015Pe09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia, A. Chakraborty	NDS 197,1 (2024)	31-May-2024

Adapted/Edited the XUNDL dataset compiled by J. Chen (NSCL, MSU), July 17, 2015.
One-proton knockout reaction.
2015Pe09: ^{31}Mg secondary beam, E=93 MeV/nucleon, was produced by fragmentation of ^{48}Ca primary beam, E=140 MeV/nucleon, at NSCL, bombarding a ^{9}Be target, thickness 888 mg/cm^2. The secondary target was also ^{9}Be, thickness 376 mg/cm^2. Fragments were separated by the A1900 separator. γ rays were detected with the SeGA array comprised of sixteen *32*-fold segmented HPGe detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, ^{30}Na-γ-coin. Deduced levels, J, π, band structures, configurations.

^{30}Na Levels

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0#	(2$^+$)		
151.0@ *9*	(1$^+$)	≈347 ps	$T_{1/2}$: from τ≈500 ps, estimated in 2015Pe09 from low-energy tail of 151γ in the γ spectra.
338.0& *14*			
424.0# *18*	(3$^+$)		
510.0& *25*			
516.0@ *17*	(2$^+$)		
758& *4*			
925.0# *21*	(4$^+$)		
1032.0@ *18*			
1263.0@ *23*			

† From a least-squares fit to γ-ray energies.
‡ Tentative assignment in 2015Pe09 based on band structure.
# Band(A): K^π=(2$^+$), 2p2h, g.s. band. Population intensity=41% *6*.
@ Band(B): K^π=(1$^+$), 2p2h band. Population intensity=49% *6*.
& Band(C): 1p1h/3p3h, π=− band. Population intensity=10% *2*.

γ(^{30}Na)

E$_i$(level)	J$_i^\pi$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$_f^\pi$	Comments
151.0	(1$^+$)	151 *1*		0	(2$^+$)	Eγ: listed in 2015Pe09 from 2007Tr08. The measured value is 148 keV in 2015Pe09. The Eγ shift is attributed to the longer mean lifetime (τ≈500 ps) of this state by the authors of 2015Pe09.
338.0		187‡ *2*		151.0	(1$^+$)	
		338‡ *2*		0	(2$^+$)	
424.0	(3$^+$)	424 *2*		0	(2$^+$)	
510.0		172‡ *2*		338.0		
516.0	(2$^+$)	365 *2*		151.0	(1$^+$)	
758		248‡ *2*		510.0		
925.0	(4$^+$)	501 *2*	40# *4*	424.0	(3$^+$)	
		925@ *3*	60 *4*	0	(2$^+$)	
1032.0		516‡ *2*		516.0	(2$^+$)	
		694‡ *3*		338.0		
		1032‡@ *3*		0	(2$^+$)	

Continued on next page (footnotes at end of table)

Be(^{31}Mg,^{30}Naγ) 2015Pe09 (continued)

$\gamma(^{30}Na)$ (continued)

E_i(level)	J_i^π	E_γ [†]	E_f	J_f^π
1263.0		747[‡] *3*	516.0	(2^+)
		1263[‡@] *3*	0	(2^+)

† From 2015Pe09.
‡ New transition (2015Pe09).
# Branching uncertainties of Iγ(925)=60 *8* and Iγ(501)=40 *5* (2015Pe09) are normalized following the method of 1988Br07.
@ The γ was identified in singles spectrum, not expected to be present in $\gamma\gamma$-coin spectrum. The placement in the level scheme is firm.

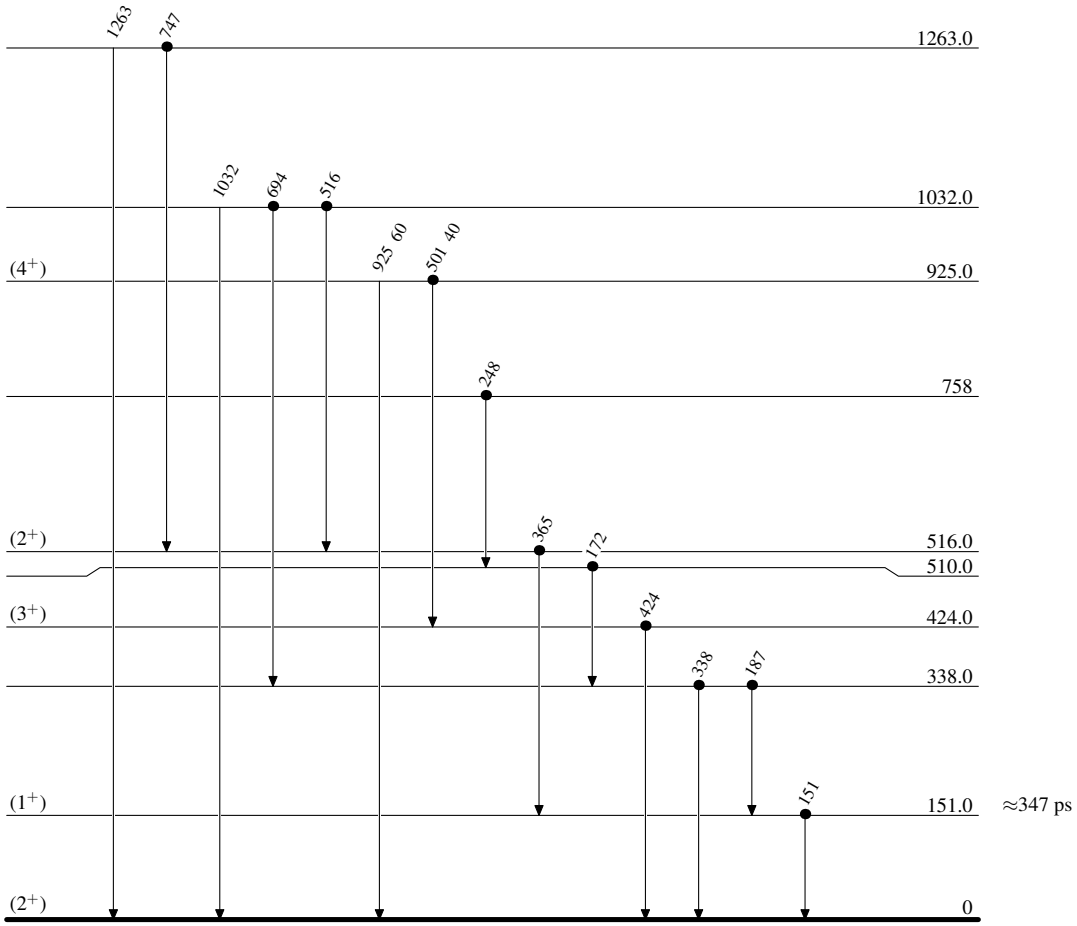
Be(^{31}Mg,^{30}Naγ) 2015Pe09

Legend

Level Scheme

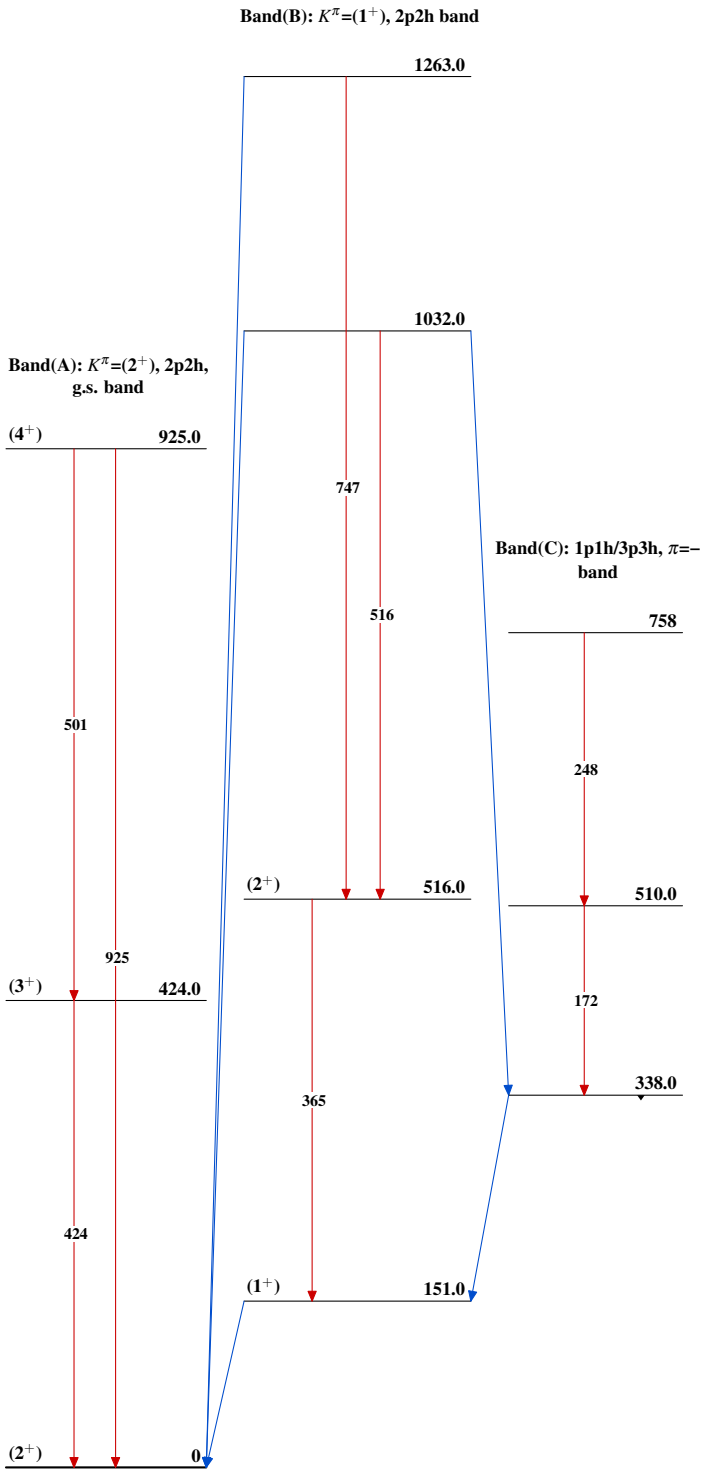
Intensities: % photon branching from each level

● Coincidence



$^{30}_{11}Na_{19}$

Be(^{31}Mg,^{30}Naγ) 2015Pe09



$^{30}_{11}Na_{19}$