^{9}Be(^{32}Mg,^{31}Mgγ) 2008Te02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 184, 29 (2022)	24-Jun-2022

2008Te02: E(^{32}Mg)=85.8 MeV/nucleon ^{32}Mg beam was produced by fragmentation of 140 MeV/nucleon ^{48}Ca primary beam on 774 mg/cm^2 ^{9}Be target at NSCL. Fragments were separated by the A1900 fragment separator and identified by means of energy loss and time-of-flight using the S800 spectrograph. γ rays were detected with the SeGA array of eighteen 32-fold segmented HPGe detectors. Measured Eγ, Iγ, particle-γ-coin, momentum distributions, cross sections. Deduced levels, L-transfers. Secondary beam produced using the reaction ^{9}Be(^{40}Ar,X) with a beam energy of 140 MeV/nucleon, A1900 fragment separator. Measured Eγ, Iγ using S800 spectrograph and segmented germanium array of 18 segmented HPGe detectors. Resolution (FWHM)=15 keV.

Summed negative-parity spectroscopic strength=1.78 *38* for ^{32}Mg target represents direct observation of this many neutrons in *fp* single-particle states. Corresponding value for ^{30}Mg target is 0.60 *12*. A dramatic increase of occupancy of neutrons in *fp* orbits gives a strong and first direct evidence of intruder mixture in the ground state of ^{32}Mg.

All data are from 2008Te02, unless otherwise noted.

^{31}Mg Levels

E(level)	J$^\pi$[†]	L	C^{2}S	Comments
0	1/2$^+$	[0]		L: assumed value from $s_{1/2}$ orbital assignment. Population=39% *6*. Cross section=37 mb *7*.
51	(3/2)$^+$	[2]		L: assumed value from $d_{3/2}$ orbital assignment.
221	(3/2)$^-$	[1]	0.59 *11*	L: assumed value from $p_{3/2}$ orbital assignment. Longitudinal momentum distribution measurement does not give a unique L value (2008Te02). Population=24.4% *21*. Cross section=23 mb *3*.
461	(7/2)$^-$	[3]	1.2 *4*	L: assumed value from $f_{7/2}$ orbital assignment. Population=20% *6*. Cross section=19 mb *6*.
673				Population=2.9% *18*. Cross section=2.7 *17*.
945		(0,1)		L: from longitudinal momentum distribution (2008Te02) from FIG 7. But it looks from fit in FIG.7 that L=2 is not entirely ruled out particularly at low momentum. Population=5.0% *11*. Cross section=4.7 mb *11*.
1158				Population=1.7% *11*. Cross section=1.6 *10*.
2244				Population=6.4% *14*. Cross section=6.0 mb *13*.

[†] As given in 2008Te02.

γ(^{31}Mg)

Eγ	Iγ[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Eγ	Iγ[†]	E$_i$(level)	E$_f$	J$_f^\pi$
171	19.1 *12*	221	(3/2)$^-$	51	(3/2)$^+$	[x]1215	1.8 *10*			
221	6.5 *5*	221	(3/2)$^-$	0	1/2$^+$	[x]1257 *7*				
240	22 *6*	461	(7/2)$^-$	221	(3/2)$^-$	[x]1506 *5*				
452	≤1.0	673		221	(3/2)$^-$	[x]1708 *8*				
623	1.4 *11*	673		51	(3/2)$^+$	[x]1790 *5*	2.1 *8*			
673	1.1 *11*	673		0	1/2$^+$	[x]1945 *7*				
697	1.7 *11*	1158		461	(7/2)$^-$	2023	1.2 *8*	2244	221	(3/2)$^-$
895	4.8 *11*	945		51	(3/2)$^+$	2193	1.4 *8*	2244	51	(3/2)$^+$
[x]1100 *5*	1.1 *10*					2244	3.8 *8*	2244	0	1/2$^+$

Continued on next page (footnotes at end of table)

^{9}Be(^{32}Mg,^{31}Mgγ) 2008Te02 (continued)

$\gamma(^{31}Mg)$ (continued)

† Intensities are normalized to 100 ^{31}Mg fragments, verified with author by email April 24, 2009.
^{x} γ ray not placed in level scheme.

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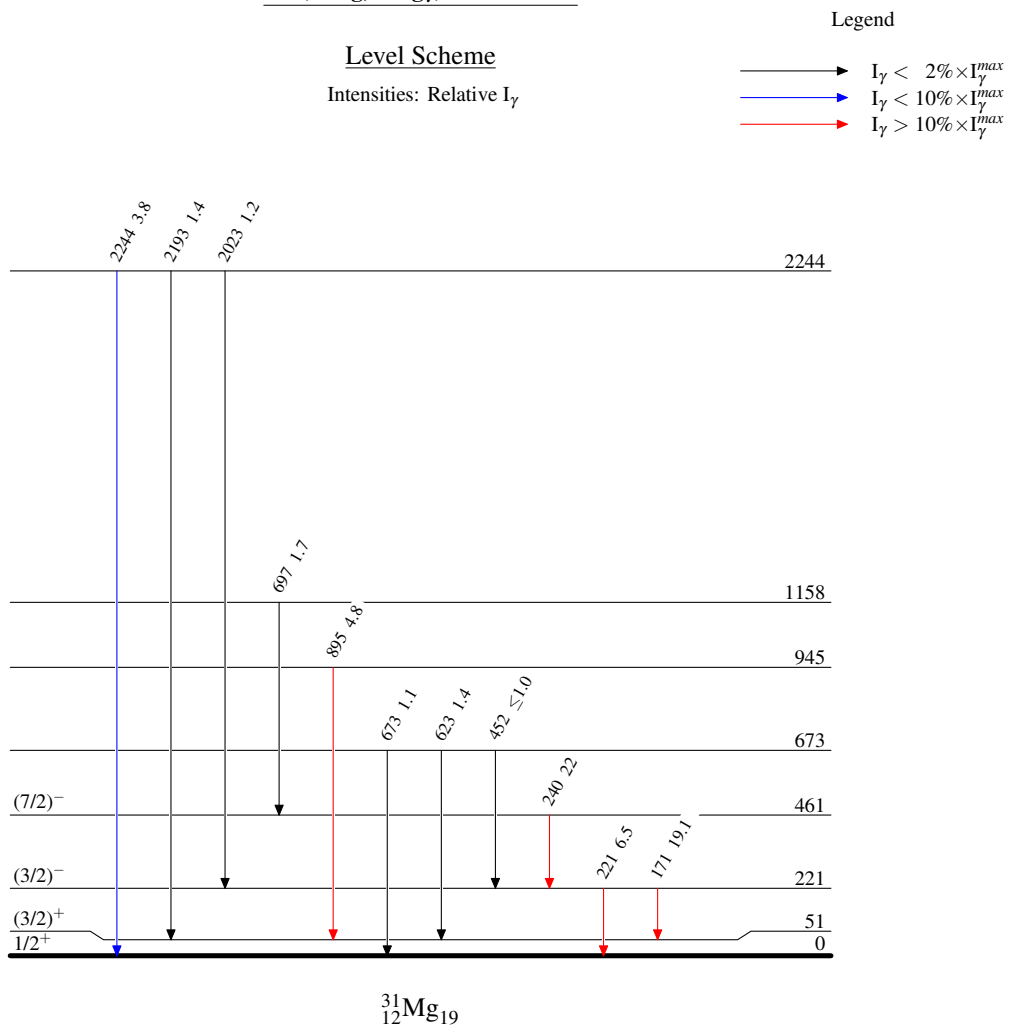
Level Scheme

Intensities: Relative I_γ



$^{31}_{12}Mg_{19}$