^{40}Ca(^{32}S,2$\alpha\gamma$) 2003Fa01,2002FaZW

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178, 41 (2021).	12-Nov-2021

2003Fa01 (also 2002FaZW, 1998De14): E(^{32}S)=125 MeV. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$(DCO), $\gamma(\theta)$, and lifetimes using the EUROBALL III array in conjunction with the silicon ball ISIS Si-ball, and a neutron wall. Deduced isospin mixing from strength of E1 transition.

^{64}Ge Levels

E(level)†	Jπ‡	$T_{1/2}$#	E(level)†	Jπ‡	$T_{1/2}$#
0.0&	0^+		4245.8[a] *15*	7^-	29.9 ps *+20−17*
902.3& *8*	2^+		5372.8[a] *18*	9^-	≤2.8 ps
1579.7 *8*	(2^+)		6606.8 *20*	$10^{(+)}$@	
2053.1& *11*	4^+		7578.9 *20*	$10^{(+)}$@	
2669.8 *11*	(4^+)		8426.9 *21*	$12^{(+)}$@	
2970.6[a] *11*	$3^{(-)}$		9299.9 *23*	$14^{(+)}$@	
3717.8[a] *11*	5^-	16.8 ps *+24−20*			

† From a least-squares fit to Eγ data.
‡ As proposed by 2003Fa01 based on $\gamma\gamma(\theta)$(DCO), $\gamma(\theta)$ and γ(lin pol) data. The assignments are consistent with those in Adopted Levels, except that most are given in parentheses there.
# From recoil-distance Doppler-shift (RDDS) method.
@ Parity not given in Adopted Levels, since no strong argument is available from $\gamma(\theta)$ and $\gamma\gamma(\theta)$ data.
& Band(A): g.s. yrast band.
[a] Band(B): Band based on $3^{(-)}$. Deduced isospin mixing (from 1665, E1+M2 transition): α^2=2.50% *+10−7*.

γ(^{64}Ge)

A_2, A_4, DCO, and POL are from 2002FaZW. The POL values quoted in 2002FaZW are from A. Gadea et al., Conf. Proc. Exptl. Nucl. Phys., AIP conf. 495, 195 (1999), Ed. B. Rubio et al.
Additional information 1.

Eγ‡	Iγ†	Ei(level)	J_i^π	E_f	J_f^π	Mult.&	δ&	Comments
528 *1*	78.0 *25*	4245.8	7^-	3717.8	5^-	E2(+M3)	+0.07 *8*	DCO=1.02 *5*; A_2=+0.43; A_4=−0.054; pol=+0.5 *3*
677 *1*	15.2 *6*	1579.7	(2^+)	902.3	2^+			Additional information 2.
747 *1*	8.9# *6*	3717.8	5^-	2970.6	$3^{(-)}$	(E2)		DCO=1.3 *4*
848 *1*	22.0@ *25*	8426.9	$12^{(+)}$	7578.9	$10^{(+)}$	Q(+O)	+0.08 *5*	DCO=0.93 *7*; A_2=+0.45; A_4=−0.038
873 *1*	34@ *3*	9299.9	$14^{(+)}$	8426.9	$12^{(+)}$	Q(+O)	0.00 *7*	DCO=1.07 *11*; A_2=+0.32; A_4=−0.083
902 *1*	100	902.3	2^+	0.0	0^+	E2		A_2=+0.46; A_4=−0.27; pol=+0.7 *3* δ(M3/E2)=0.
1048 *1*	13.0# *9*	3717.8	5^-	2669.8	(4^+)	(E1)		DCO=0.53 *17*; pol=−0.8 *7*
1090 *1*	10.5# *8*	2669.8	(4^+)	1579.7	(2^+)			
1127 *1*	57@ *5*	5372.8	9^-	4245.8	7^-	E2(+M3)	−0.04 *4*	DCO=0.88 *6*; A_2=+0.33; A_4=−0.16; pol=+0.6 *3*
1151 *1*	75.0 *18*	2053.1	4^+	902.3	2^+	E2+M3	+0.06 *1*	DCO=1.20 *12*; A_2=+0.37; A_4=−0.054; pol=+0.8 *4*
1234 *1*	33@ *3*	6606.8	$10^{(+)}$	5372.8	9^-	D+Q	−3.5 *+34−24*	DCO=0.66 *5*; A_2=−0.43; A_4=+0.14

Continued on next page (footnotes at end of table)

^{40}Ca(^{32}S,2$\alpha\gamma$) 2003Fa01,2002FaZW (continued)

$\gamma(^{64}Ge)$ (continued)

E_γ[‡]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	δ[&]	Comments
1580 *1*	<5.0[#]	1579.7	(2^+)	0.0	0^+			
1665 *1*	56.7 *18*	3717.8	5^-	2053.1	4^+	E1+M2	−0.09 *3*	DCO=0.64 *5*; A_2=−0.34; A_4=+0.16; pol=−0.8 *5* Mult.: linear polarization data and angular correlation data are also consistent with M1, but systematics of nuclei in this region do not support this assignment. δ: according to 2003Fa01, the second solution of −0.09 *3* is not likely since it has reduced χ^2=0.80, as compared to 0.54 for the higher δ value. On the other hand 1991En01 preferred the lower δ value and B(M2) values below also support the lower value of the mixing ratio, which is adopted by the evaluators. B(E1)(W.u.)=4.1×10^{-6} *6*, B(M2)(W.u.)=0.055 *+43−30* for δ(M2/E1)=−0.09 *3*. B(E1)(W.u.)=2.5×10^{-7} *+12−5*, B(M2)(W.u.)=6.4 *+8−10* for δ(M2/E1)=−3.9 *+7−4*, which gives unreasonably high B(M2)(W.u.), as RUL(M2)=1. R(θ)=−0.09 *5*.
1820 *1*	30[@] *3*	8426.9	$12^{(+)}$	6606.8	$10^{(+)}$	Q(+O)	−0.06 *7*	DCO=0.97 *8*; A_2=+0.29; A_4=−0.16
2068 *1*	9.6 *6*	2970.6	$3^{(-)}$	902.3	2^+			
2206 *1*	25[@] *3*	7578.9	$10^{(+)}$	5372.8	9^-	D+Q	−6 *+6−7*	DCO=0.54 *7*; A_2=−0.29; A_4=+0.18

[†] From 2002FaZW The values are from 902-gated spectra, unless otherwise stated.
[‡] Uncertainty of 1 keV assigned as suggested by 2002FaZW.
[#] Proportion with 1665 transition in 528-gated spectra.
[@] From 1665-gated spectra, taking the 528 transition as reference.
[&] From $\gamma\gamma(\theta)$(DCO), $\gamma(\theta)$ and γ(lin pol) data in 2002FaZW.

^{40}Ca(^{32}S,2$\alpha\gamma$) 2003Fa01,2002FaZW

Level Scheme

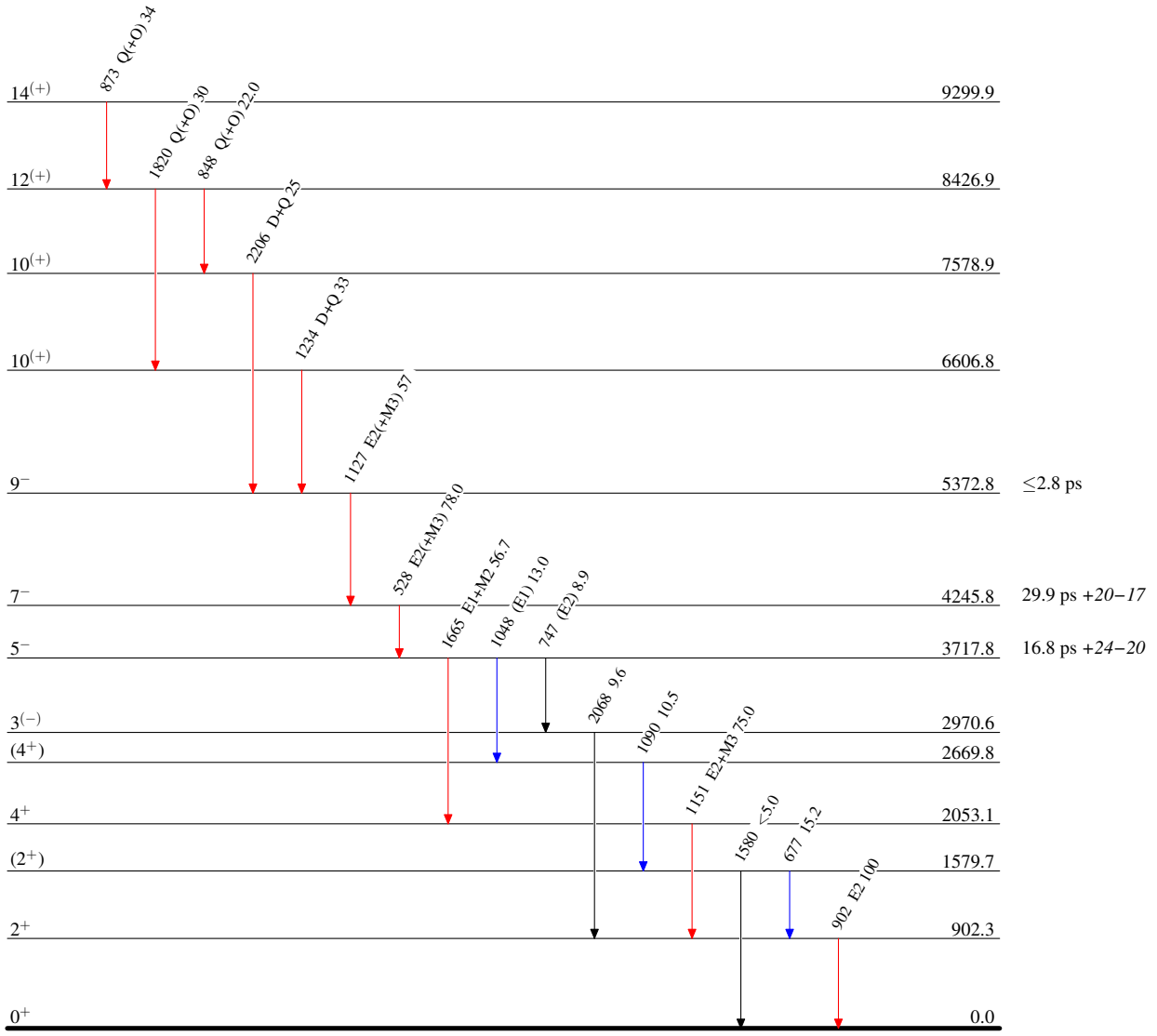
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

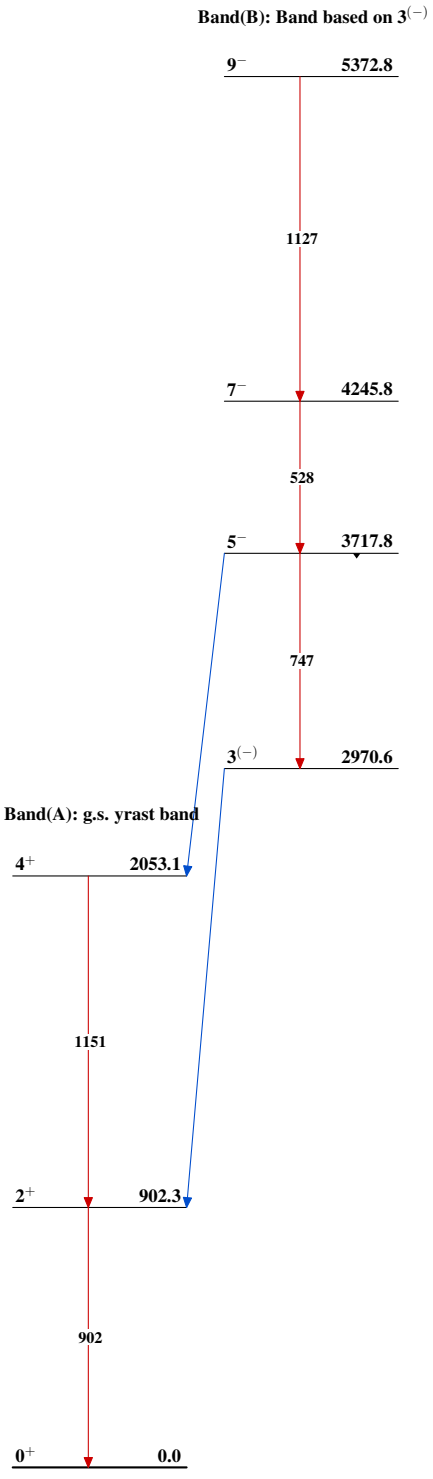
$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{64}_{32}Ge_{32}$

^{40}Ca(^{32}S,2$\alpha\gamma$) 2003Fa01,2002FaZW



$^{64}_{32}Ge_{32}$