^{40}Ca(^{12}C,pnγ) 2002Pi04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 157, 1 (2019)	15-Apr-2019

2002Pi04: E=27 MeV beam from the ESTU tandem accelerator at Yale. Measured Eγ, Iγ, $\gamma\gamma$, lifetimes by DSAM using SPEEDY array of seven side-segmented Ge detectors and a large volume Ge detector. Five Clover detectors and the Ge detector were surrounded by BGO anti-Compton shields. Deduced levels, J, π, $T_{1/2}$, band structures. Four new γ rays detected in 2002Pi04: 887, 1258, 1339, 1898.

M.M. Giles et al., Phys. Rev. C, accepted April 9, 2019 (pre-publication copy received from authors April 10, 2019): E=30.5 MeV ^{12}C beam was produced from the FN Tandem facility of the University of Cologne. Target was 0.5 mg/cm^2 ^{40}Ca foil on ^{197}Au backings. The γ rays were detected by 11 Ge detectors. Measured Eγ, Iγ, $\gamma\gamma$-coin, level lifetimes by recoil-distance Doppler-shifts using Cologne plunger device. Deduced B(E2) for the 2^+ state at 800 keV. Comparison with shell-model calculations.

All data are from 2002Pi04, unless otherwise noted.

^{50}Mn Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0[@]	0^+		
224.6[a] *11*	5^+	1.75 min *3*	$T_{1/2}$: from Adopted Levels. E(level): 2002Pi04 give 224.5 *2*.
650.6[&] *9*	1^+		
658.7[a] *11*	6^+		
800.0[@] *7*	2^+	4.44 ps *14*	T=1 $T_{1/2}$: from mean lifetime τ=6.4 ps *2* (M.M. Giles et al., Phys. Rev. C, accepted April 9, 2019) using recoil-distance Doppler-shift (RDDS) and differential decay curve method (DDCM). Other: >0.7 ps (2002Pi04, DSAM).
1030.0[a] *11*	7^+		
1142.9[&] *9*	3^+	0.33 ps *+11−8*	T=0
1727.0 *8*	1^-		
1874.1 *8*	2		
1916.7[&] *11*	5^+	>0.7 ps	T=0
1931.1[@] *10*	4^+	<0.090 ps	T=1 $T_{1/2}$: effective half-life=0.073 ps *16*.
2119.3[a] *11*	8^+	<0.73 ps	T=0 $T_{1/2}$: effective half-life=0.60 ps *+13−8*.
2340.0 *10*	$3^{(-)}$		
2533.8[a] *11*	9^+	<0.77 ps	T=0 $T_{1/2}$: effective half-life=0.64 ps *+13−10*.
2556.6 *10*	(5)		
2614.0 *13*			
3255.7[@] *15*	(6^+)	<0.07 ps	T=(1)
3370.0 *14*			
3438.2 *14*			

[†] From least-squares fit to Eγ values.
[‡] As assigned in 2002Pi04.
[#] From DSAM (2002Pi04), unless otherwise noted.
[@] Band(A): g.s. band.
[&] Band(B): Band based on 1^+.
[a] Band(C): Band based on 5^+.

^{40}Ca(^{12}C,pnγ) 2002Pi04 (continued)

$\gamma(^{50}Mn)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Comments
650.6	1^+	651		0	0^+	E_γ: from M.M. Giles et al., Phys. Rev. C, accepted April 9, 2019.
658.7	6^+	434.0 *1*	100	224.6	5^+	
800.0	2^+	149		650.6	1^+	
		800		0	0^+	
1030.0	7^+	371.4 *1*	12 *3*	658.7	6^+	
		805.4 *1*	100 *2*	224.6	5^+	
1142.9	3^+	343		800.0	2^+	
		492		650.6	1^+	
1727.0	1^-	927		800.0	2^+	
		1727		0	0^+	
1874.1	2	731		1142.9	3^+	
		1074		800.0	2^+	
		1224		650.6	1^+	
		1874		0	0^+	
1916.7	5^+	774	100 *5*	1142.9	3^+	
		886.7 *1*	35 *5*	1030.0	7^+	
		1258.0 *1*	22 *5*	658.7	6^+	
1931.1	4^+	788		1142.9	3^+	
		1131		800.0	2^+	
2119.3	8^+	1089.3 *2*	100 *12*	1030.0	7^+	
		1460.6 *2*	90 *20*	658.7	6^+	
2340.0	$3^{(-)}$	613		1727.0	1^-	
		1540		800.0	2^+	
2533.8	9^+	1503.7 *2*	100	1030.0	7^+	
2556.6	(5)	625	100† *12*	1931.1	4^+	
		1414	53† *2*	1142.9	3^+	
		1897.9 *3*	81 *3*	658.7	6^+	
2614.0		887		1727.0	1^-	
3255.7	(6^+)	1339.0 *10*	100	1916.7	5^+	
3370.0		1030		2340.0	$3^{(-)}$	
3438.2		1507		1931.1	4^+	

† Weighted average of values from 2002Pi04 and values from 2000Sc35 in (p,nγ). Values from 2002Pi04 for those γ transitions are not given explicitly.

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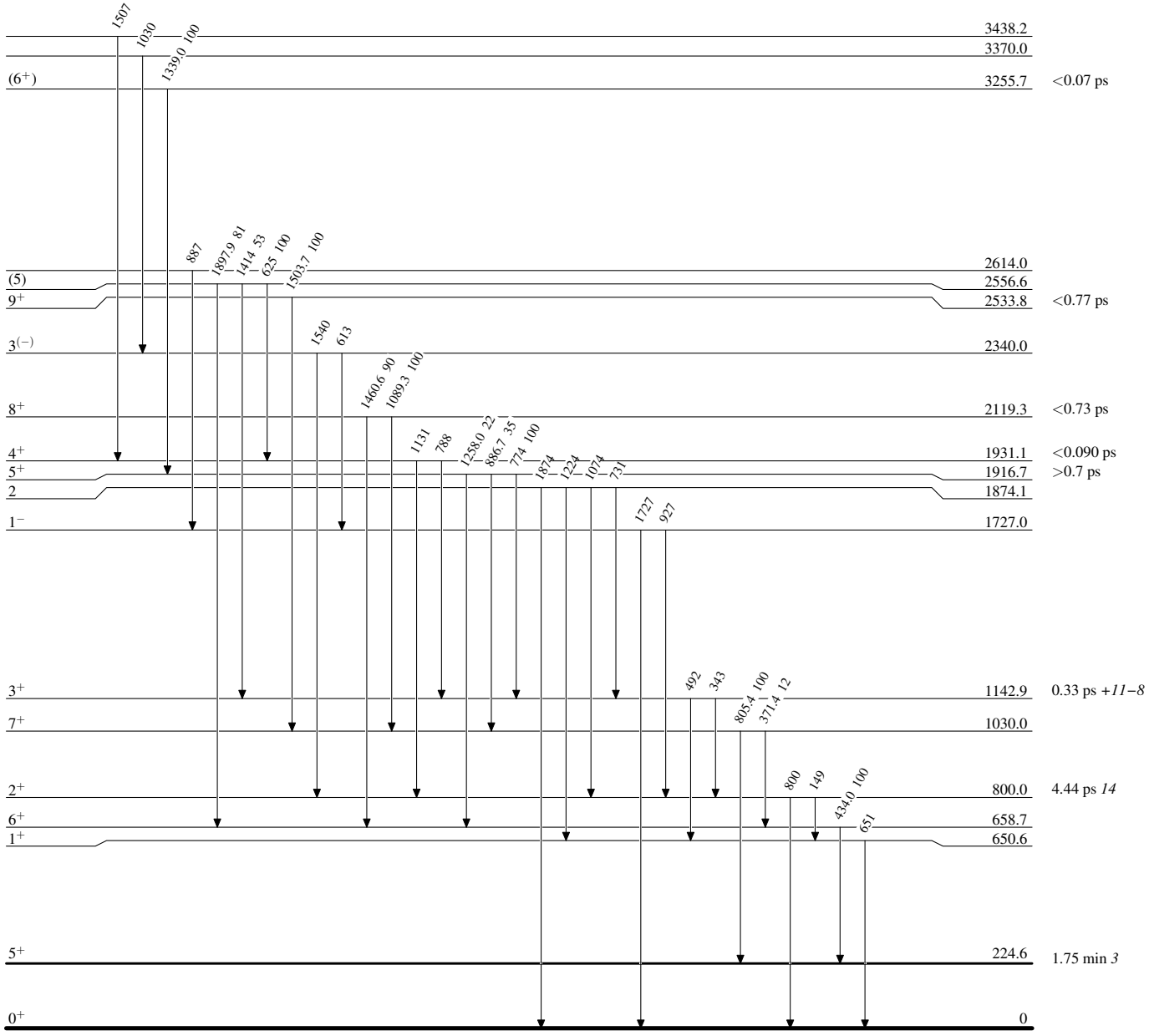
Level Scheme

Intensities: Relative photon branching from each level



$^{50}_{25}Mn_{25}$

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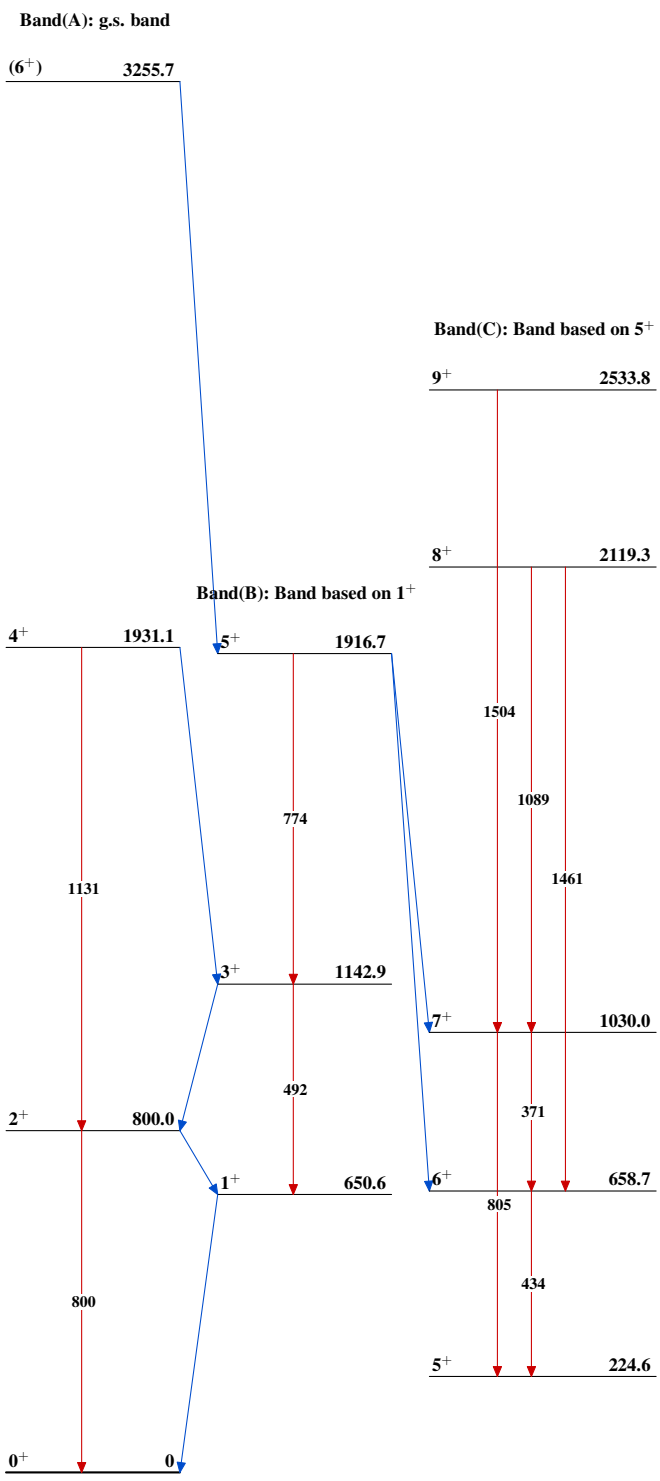

$^{50}_{25}Mn_{25}$