^{26}Mg(^{13}C,αpnγ) 2016Fu09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 199,1 (2025)	30-Sep-2024

Adapted from the XUNDL dataset compiled by E. McCutchan, September 28, 2016.

2016Fu09: E=46 MeV ^{13}C beam was provided by the FN tandem accelerator at the Institute for Nuclear Physics in Cologne. The target was 0.22 mg/cm^2 of ^{26}Mg coated on a 66 mg/cm^2 Bi backing with additional 1 mg/cm^2 Indium layer and 108 mg/cm^2 Copper layer. γ rays were detected with the HORUS array consisting of 14 HPGe detectors, six of them with Compton-suppression shields. Measured Eγ, Iγ, $\gamma\gamma(\theta)$. Deduced levels, J, π, γ-ray multipolarities, mixing ratios. Comparison to *p-sd-pf* shell-model calculations using the PSDPF interaction.

^{33}P Levels

E(level)†	J$^\pi$‡	Comments
0.0	1/2$^+$	
1431.64 *23*	3/2$^+$	
1847.55 *23*	5/2$^+$	
3490.22 *34*	5/2$^+$	
3627.71 *42*	7/2$^+$	
4225.84 *35*	7/2$^-$	
5452.16 *39*	9/2$^-$	
5637.84 *43*	11/2$^-$	
6518.2 *11*		
6807.1 *7*	(7/2,9/2,11/2)	
6935.9 *5*	(9/2,13/2)	J$^\pi$: 15/2 and 7/2 excluded by $\gamma\gamma(\theta)$ analysis.
6987.2 *6*	(7/2,9/2,11/2)	
9077.7 *6*	(7/2,11/2,15/2)	
10105.4 *7*		J$^\pi$: (5/2,9/2,13/2,17/2) assigned by 2016Fu09, based on decay pattern and possibly $\gamma\gamma(\theta)$.

† From a least-squares fit to γ-ray energies.

‡ As proposed by 2016Fu09 based on measured $\gamma\gamma(\theta)$ and decay patterns.

γ(^{33}P)

E$_i$(level)	J$^\pi_i$	E$_\gamma$†	I$_\gamma$†	E$_f$	J$^\pi_f$	Mult.‡	δ‡	Comments
1431.64	3/2$^+$	1431.6 *3*	100.0 *10*	0.0	1/2$^+$			
1847.55	5/2$^+$	415.9 *2*	7.0 *1*	1431.64	3/2$^+$			
		1847.5 *3*	100.0 *5*	0.0	1/2$^+$			
3490.22	5/2$^+$	1642.6 *4*	100.0 *22*	1847.55	5/2$^+$			
		2058.5 *8*	73.6 *25*	1431.64	3/2$^+$			
		3490.1 *10*	13.4 *15*	0.0	1/2$^+$			
3627.71	7/2$^+$	1780.1 *6*	44.5 *45*	1847.55	5/2$^+$			
		2196.0 *8*	100.0 *48*	1431.64	3/2$^+$			
4225.84	7/2$^-$	735.6 *3*	8.9 *2*	3490.22	5/2$^+$			
		2378.2 *5*	100.0 *4*	1847.55	5/2$^+$	D		δ: δ=0.0 used in $\gamma\gamma(\theta)$ analysis.
		2794.1 *13*	1.2 *2*	1431.64	3/2$^+$			
5452.16	9/2$^-$	1226.3 *3*	100.0 *3*	4225.84	7/2$^-$	D+Q	+1.0 *2*	
		1824.4 *4*	8.7 *2*	3627.71	7/2$^+$			
		3604.5 *15*	1.3 *4*	1847.55	5/2$^+$			
5637.84	11/2$^-$	185.6 *3*	79.9 *18*	5452.16	9/2$^-$			
		1411.9 *4*	100.0 *23*	4225.84	7/2$^-$	Q		δ: δ(O/Q)=−0.02 *4* from 1412γ-2378$\gamma(\theta)$.
6518.2		880.3 *12*	100 *7*	5637.84	11/2$^-$			
6807.1	(7/2,9/2,11/2)	1168.6 *8*	100 *11*	5637.84	11/2$^-$			
		2581.6 *10*	19.6 *50*	4225.84	7/2$^-$			

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^{26}Mg(^{13}C,αpnγ) 2016Fu09 (continued)

γ(^{33}P) (continued)

E_i(level)	J^π_i	E_γ †	I_γ †	E_f	J^π_f	Mult.‡	Comments
6935.9	(9/2,13/2)	1297.9 *4*	100.0 *31*	5637.84	11/2$^-$	Q(+D)	δ: +9.9 *42* for J(6936)=9/2 and −18 *10* for J(6936)=13/2 from 1298γ-1412γ(θ). The values are +1.7 *60* and −2.6 *29*, respectively, from 2091γ-1298γ(θ) from 9078 level.
		1484.2 *9*	13.8 *29*	5452.16	9/2$^-$		
6987.2	(7/2,9/2,11/2)	1349.4 *10*	49 *10*	5637.84	11/2$^-$		
		1535.4 *11*	36.3 *71*	5452.16	9/2$^-$		
		2761.0 *11*	100 *11*	4225.84	7/2$^-$		
9077.7	(7/2,11/2,15/2)	2090.6 *5*	50.3 *29*	6987.2	(7/2,9/2,11/2)	D(+Q)	δ: −0.1 *1* from 2091γ-1298γ(θ) for J(9078)=11/2 and J(6936)=9/2, or J(9078)=15/2 and J(6936)=13/2. The values are +0.2 *4* and −2.6 *30*, respectively, from 1028γ-2091γ(θ) from 10105 level.
		2141.8 *7*	100.0 *35*	6935.9	(9/2,13/2)		
		2269.8 *12*	18.9 *29*	6807.1	(7/2,9/2,11/2)		
		3440 *2*	25.3 *25*	5637.84	11/2$^-$		
10105.4		1027.6 *3*	100.0 *18*	9077.7	(7/2,11/2,15/2)	D(+Q)	δ: +0.1 *1* from 1028γ-2091γ(θ) for J(10105)=13/2 and J(9078)=11/2, or J(10105)=17/2 and J(9078)=15/2.
		3169.4 *12*	19.4 *15*	6935.9	(9/2,13/2)		
		3587 *2*	13.4 *17*	6518.2			
		4468 *3*	5.7 *11*	5637.84	11/2$^-$		

† From 2016Fu09.
‡ Deduced based on $\gamma\gamma(\theta)$ data shown in Fig.3 of 2016Fu09. Additional δ values are given in Fig. 3 considering a number of possible J^π assignments for the 10106-, 9078-, and 6936-keV levels.

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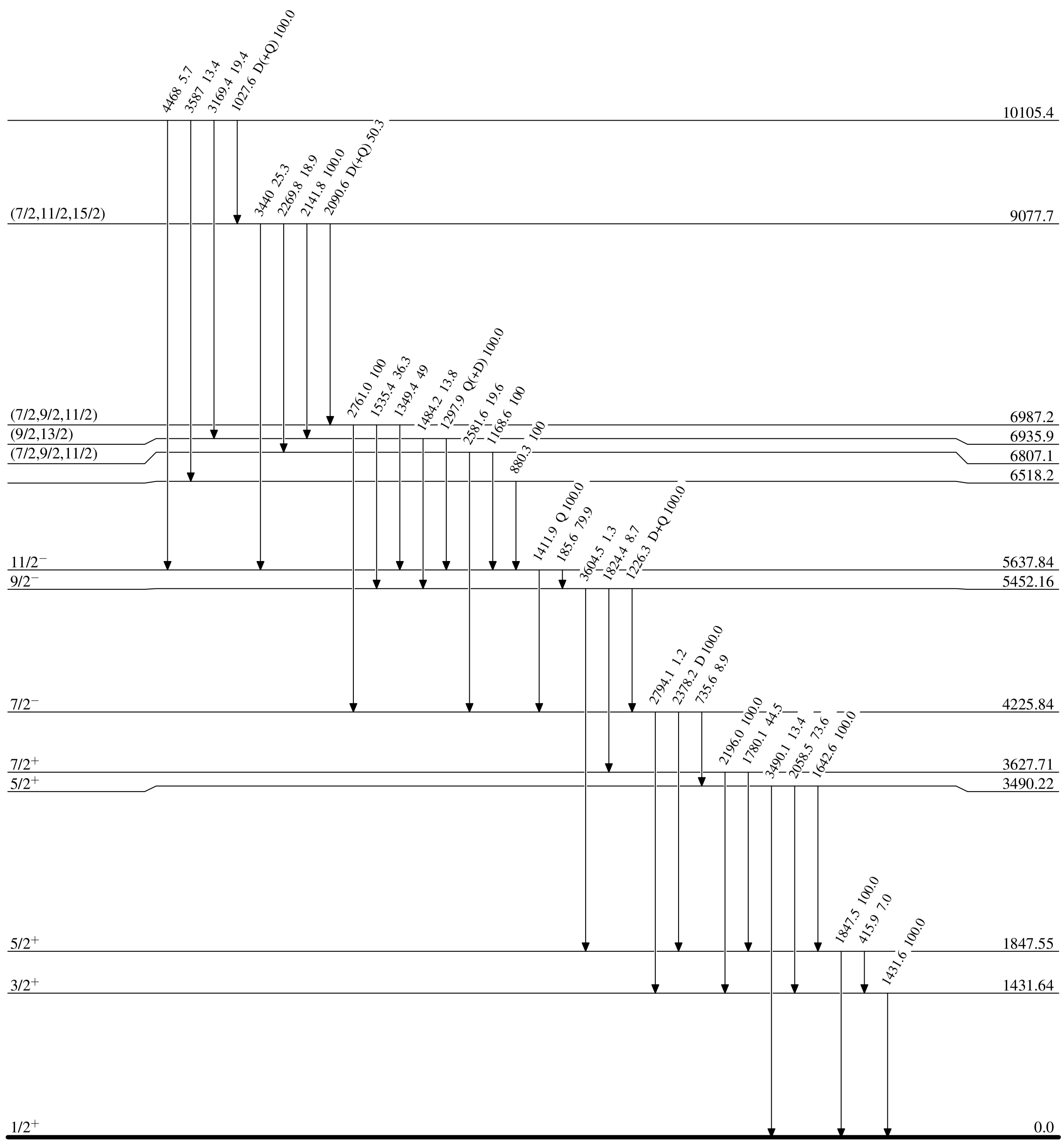
Level Scheme

Intensities: Relative photon branching from each level



$^{33}_{15}P_{18}$