^{24}Mg(^{12}C,αnγ) 2021Te07

History

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

2021Te07: E(^{12}C)=45 MeV. Measured Eγ, Iγ, $\gamma\gamma$-coin, (particle)γ-coin $\gamma\gamma(\theta)$(ADO) using GALILEO array of 25 Compton-suppressed HPGe detectors for γ radiation, EUCLIDES Si-ball for charged particles and Neutron Wall for neutrons at the XTU tandem accelerator facility at Legnaro. Deduced mirror energy differences (MEDs) for ^{31}P and ^{31}S structures. Comparison with shell-model calculations, and with structure of mirror nucleus ^{31}S.
Additional information 1.

^{31}S Levels

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0#	1/2+	4452.0@ 6	7/2−	6378.7@ 9	9/2−	7643.2 15	(11/2−)
1249.8# 1	3/2+	4584.8 5	7/2+	6393.6# 8	11/2+	8463.6@ 10	13/2−
2235.0# 5	5/2+	5302.5# 6	9/2+	6637.1 14	(9/2−)	9153.7# 11	13/2+
3286.3 4	5/2+	5674.4 15	7/2+	6835.2@ 7	11/2−	10148@ 4	15/2−
3352.0# 4	7/2+	5979.0 6	(9/2+)	7301.3 9	11/2+		

† From a least-squares fit to Eγ data.
‡ As proposed by 2021Te07 based on earlier assignments for low-energy levels and their $\gamma(\theta)$ data. Assignments are the same in Adopted Levels, except that some have been given in parentheses there.
# Member of yrast sequence based on 1/2+.
@ Member of sequence based on 7/2−.

γ(^{31}S)

R_{ADO}=Iγ(152°)/Iγ(90°). Expected $R_{ADO}\approx$0.64 for ΔJ=1, dipole transitions, and ≈1.4 for ΔJ=2, quadrupole transitions.

Eγ	Iγ	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.†	Comments
907.6 5		7301.3	11/2+	6393.6	11/2+		
1006.1 5		7643.2	(11/2−)	6637.1	(9/2−)		
1051.4 3		3286.3	5/2+	2235.0	5/2+	D+Q	R_{ADO}=1.08 32. Mult.: ΔJ=0 transition.
1090.5 7		6393.6	11/2+	5302.5	9/2+		
1166.1 5	23 5	4452.0	7/2−	3286.3	5/2+	D	R_{ADO}=0.82 2.
1232.8 2		4584.8	7/2+	3352.0	7/2+		
1249.8 1	100 12	1249.8	3/2+	0.0	1/2+	D+Q	R_{ADO}=0.93 14.
1298.4 3	5 1	4584.8	7/2+	3286.3	5/2+	D+Q	R_{ADO}=1.0 5.
1394.2 4		5979.0	(9/2+)	4584.8	7/2+		
1532.3 5		6835.2	11/2−	5302.5	9/2+	D	R_{ADO}=0.81 25.
1629.0 15		8463.6	13/2−	6835.2	11/2−		
1852.1 8		9153.7	13/2+	7301.3	11/2+		
1926.4 8		6378.7	9/2−	4452.0	7/2−	D+Q	R_{ADO}=1.63 9.
1949.8 5		5302.5	9/2+	3352.0	7/2+	D+Q	R_{ADO}=0.64 15.
2035.9 8	14 1	3286.3	5/2+	1249.8	3/2+		
2084.7 6		8463.6	13/2−	6378.7	9/2−		
2101.9 5	60 7	3352.0	7/2+	1249.8	3/2+	Q	R_{ADO}=1.19 8.
2184.4 20		6637.1	(9/2−)	4452.0	7/2−		
2235.8 8		2235.0	5/2+	0.0	1/2+		
2322.3 14		5674.4	7/2+	3352.0	7/2+		
2384.3 8		6835.2	11/2−	4452.0	7/2−	Q	R_{ADO}=1.49 36.

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^{24}Mg(^{12}C,αnγ) 2021Te07 (continued)

γ(^{31}S) (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
2761.7 *30*	9153.7	13/2$^+$	6393.6	11/2$^+$		
3042.2 *10*	6393.6	11/2$^+$	3352.0	7/2$^+$	Q	R_{ADO}=1.44 *45*.
3176 *3*	9153.7	13/2$^+$	5979.0	(9/2$^+$)		
3192 *6*	7643.2	(11/2$^-$)	4452.0	7/2$^-$		
3285.3 *17*	6637.1	(9/2$^-$)	3352.0	7/2$^+$		
3285.8 *14*	3286.3	5/2$^+$	0.0	1/2$^+$		
3313 *4*	10148	15/2$^-$	6835.2	11/2$^-$		
[x]3612 *3*						
3743 *4*	5979.0	(9/2$^+$)	2235.0	5/2$^+$		
[x]3930 *3*						
3951 *3*	7301.3	11/2$^+$	3352.0	7/2$^+$		

[†] From $\gamma(\theta)$ data. The evaluators assign mult=Q for ΔJ=2, quadrupole transitions and D or D+Q for ΔJ=1 and in a few cases ΔJ=0 transitions. 2021Te07 assign E2 for the former and mostly M1+E2 for the latter, and E1 for pure dipole transitions, while also taking assignments based on mirror symmetry arguments with multipolarity assignments for ^{31}P, and from previous literature.

[x] γ ray not placed in level scheme.

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Level Scheme

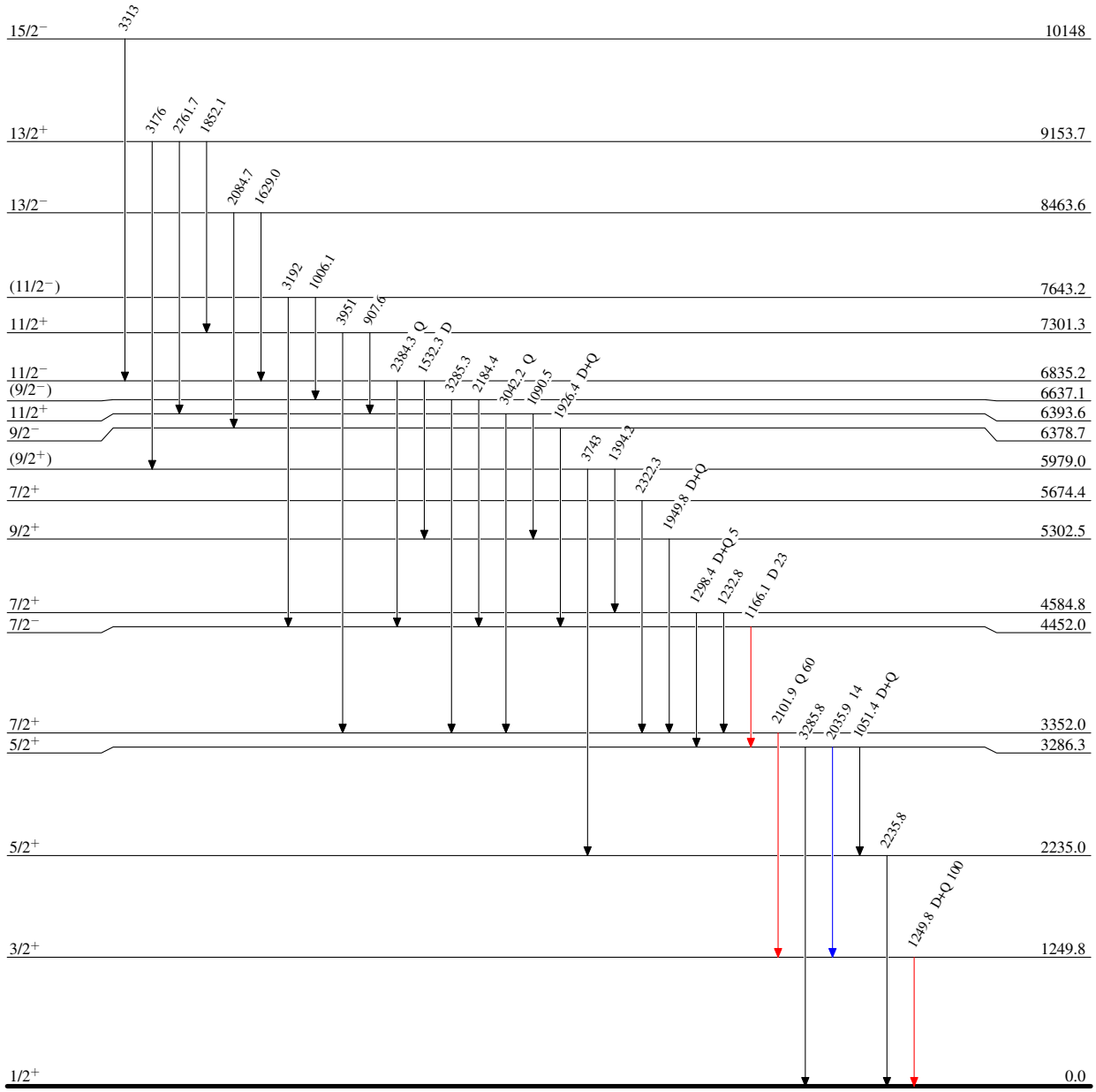
Intensities: Relative I_γ

Legend

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

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

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



$^{31}_{16}S_{15}$