

$^{12}\text{C}(^{58}\text{Ni},\alpha p\gamma)$ 1999Da10

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 202,59 (2025)	25-Feb-2025

Adapted from the XUNDL dataset for 1999Da10, compiled by Jordan Chenkin and B. Singh (McMaster) on June 11, 1999.

1999Da10: E=261 MeV ^{58}Ni beam was produced from the tandem accelerator of the Niels Bohr Institute in Denmark. Target was 1.5 mg/cm² ^{12}C on a gold backing. γ rays were detected with the NORDBALL array consisting of 15 Compton-suppressed Ge detectors. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coin, $\gamma\gamma(\theta)$. Deduced levels, J, π , band structure, γ -ray multipolarities.

 ^{65}Ga Levels

The following levels reported by 1999Da10 are not reported by 2001We11 in $^{40}\text{Ca}(^{32}\text{S},\alpha 2p\gamma)$ (their level scheme adopted in Adopted Levels), either because of different placements of γ rays or deexcitation γ rays not seen in the latter study: 2466.9, 3173.0, 3735.5, 4738.6, 5714.0, 6135.7, 6523.2. Those levels are not adopted in Adopted Levels.

E(level) ^{†‡}	J π [#]	Comments
0.0 ^{&}	3/2 ⁻	
190.5 2	5/2 ⁻	
808.7 3	(5/2 ⁻)	J π : 1/2 ⁻ , 3/2 ⁻ in Adopted Levels.
1075.2 ^{&} 2	7/2 ⁻	
1286.6 3	9/2 ⁻	
1353.0 3	(7/2 ⁻)	
2037.4 3	9/2 ⁺	
2466.9? ^{@&} 4	11/2 ⁽⁻⁾	
2787.6 3	13/2 ⁻	
2812.8 3	11/2 ⁽⁺⁾	
3064.4 3	13/2 ⁺	
3173.0? [@] 4	11/2 ⁺ , 13/2 ⁺	
3731.8 3	15/2 ⁺	
3735.5? ^{@&} 4	15/2 ⁽⁻⁾	
3909.7 3	15/2 ⁽⁺⁾	
4122.1 3	17/2 ⁺	
4329.8 3	17/2 ⁺	
4432.6 3	17/2 ⁺	
4546.0 4	19/2 ⁺	
4632.1 4	17/2 ⁺	
4738.6? [@] 4	19/2 ⁽⁺⁾	
5465.7 3	19/2	
5496.6 4	21/2 ⁺	
5714.0 [@] 4	19/2, 21/2	
5915.6 4	21/2 ⁺	
5943.5 4	21/2	
6135.7? [@] 4	21/2	
6293.4 4	23/2	
6523.2? [@] 6		
6814.8 4	25/2 ⁺	
7361.1 5	27/2	
7940.0 5		
8603.2 6		

[†] Additional information 1.

[‡] From a least-squares fit to γ -ray energies.

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$^{12}\text{C}(^{58}\text{Ni},\alpha\gamma)$ **1999Da10 (continued)** ^{65}Ga Levels (continued)# As given in [1999Da10](#), based on measured $\gamma\gamma(\theta)$ and band assignments.

@ Level not confirmed in other studies and considered questionable by the evaluator.

& Band(A): Band based on $3/2^-$ g.s. $\gamma(^{65}\text{Ga})$

For intensity ratio R from $\gamma\gamma(\theta)$ given under comments, expected values are ≈ 1.5 for a stretched quadrupole transition and ≈ 0.8 for a stretched dipole transition; for mixed transitions, R values vary in the range of 0.3 to 1.8 ([1999Da10](#)).

E_γ †	I_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	Comments
190.5 3	100 9	190.5	5/2 ⁻	0.0	3/2 ⁻	D	R=0.85 3.
216.2 3	1.5 2	4546.0	19/2 ⁺	4329.8	17/2 ⁺	D	R=0.80 9.
277.1 # @ 4	0.3 1	3064.4	13/2 ⁺	2787.6	13/2 ⁻		
310.3 3	6.0 5	4432.6	17/2 ⁺	4122.1	17/2 ⁺		R=1.30 7.
349.9 3	0.6 1	6293.4	23/2	5943.5	21/2	D	R=0.73 14.
390.3 # @ 4	0.3 1	4122.1	17/2 ⁺	3731.8	15/2 ⁺	D	R=0.77 40.
419.0 3	0.4 1	5915.6	21/2 ⁺	5496.6	21/2 ⁺	(D+Q)	R=1.21 23.
420.2 3	2.1 2	4329.8	17/2 ⁺	3909.7	15/2 ⁽⁺⁾	D	R=0.85 14.
421.5 # @ 4	0.2 1	6135.7?	21/2	5714.0	19/2,21/2		
423.8 3	1.4 1	4546.0	19/2 ⁺	4122.1	17/2 ⁺	D	R=0.81 12.
521.9 4	0.2 1	6814.8	25/2 ⁺	6293.4	23/2		
544.2 4	0.4 1	1353.0	(7/2 ⁻)	808.7	(5/2 ⁻)		
558.6 # @ 4	0.4 1	3731.8	15/2 ⁺	3173.0?	11/2 ⁺ ,13/2 ⁺		
579.5 # @ 5	0.1 1	6293.4	23/2	5714.0	19/2,21/2		
594.2 # @ 4	0.4 1	4329.8	17/2 ⁺	3735.5?	15/2 ⁽⁻⁾	D	R=0.78 34.
597.8 3	2.5 2	4329.8	17/2 ⁺	3731.8	15/2 ⁺	(D+Q)	R=1.13 17.
616.5 3	2.9 3	4738.6?	19/2 ⁽⁺⁾	4122.1	17/2 ⁺	D	R=0.71 8.
							E_γ : a 616.9 γ placed from 5467, 19/2 ⁽⁻⁾ level in 2001We11 .
667.5 3	4.0 3	3731.8	15/2 ⁺	3064.4	13/2 ⁺	D	R=0.70 9.
670.1 # @ 3	1.5 2	6135.7?	21/2	5465.7	19/2	D	R=0.56 15.
684.6 4	0.8 1	2037.4	9/2 ⁺	1353.0	(7/2 ⁻)		
700.6 3	1.2 1	4432.6	17/2 ⁺	3731.8	15/2 ⁺	D+Q	R=0.43 15.
727.1 3	2.1 2	5465.7	19/2	4738.6?	19/2 ⁽⁺⁾	(D+Q)	R=1.44 10.
							E_γ : a 727.3 γ placed from 4850, 17/2 ⁺ level in 2001We11 .
750.6 3	54 5	2037.4	9/2 ⁺	1286.6	9/2 ⁻	(D+Q)	R=1.28 4.
775.5 3	1.0 1	2812.8	11/2 ⁽⁺⁾	2037.4	9/2 ⁺		
796.9 3	5.2 5	6293.4	23/2	5496.6	21/2 ⁺		R=0.71 8.
808.7 4	0.4 1	808.7	(5/2 ⁻)	0.0	3/2 ⁻		
814.2 3	15.3 14	4546.0	19/2 ⁺	3731.8	15/2 ⁺	Q	R=1.34 4.
827.8 3	10.6 9	6293.4	23/2	5465.7	19/2	Q	R=1.35 4.
833.6 4	0.3 1	5465.7	19/2	4632.1	17/2 ⁺		
845.3 # @ 4	0.7 1	3909.7	15/2 ⁽⁺⁾	3064.4	13/2 ⁺		
884.4 3	9.2 8	1075.2	7/2 ⁻	190.5	5/2 ⁻	D	R=0.70 5.
899.1 3	5.0 5	6814.8	25/2 ⁺	5915.6	21/2 ⁺	Q	R=1.28 7.
919.0 3	3.3 3	3731.8	15/2 ⁺	2812.8	11/2 ⁽⁺⁾		
919.5 4	0.4 1	5465.7	19/2	4546.0	19/2 ⁺		
944.1 3	20.0 17	3731.8	15/2 ⁺	2787.6	13/2 ⁻	D	R=0.81 3.
962.1 3	11.3 10	2037.4	9/2 ⁺	1075.2	7/2 ⁻	D	R=0.71 10.
1026.9 3	60 5	3064.4	13/2 ⁺	2037.4	9/2 ⁺	Q	R=1.31 4.
1033.2 3	6.0 5	5465.7	19/2	4432.6	17/2 ⁺	D	R=0.74 5.

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$^{12}\text{C}(^{58}\text{Ni},\alpha p\gamma)$ **1999Da10** (continued) $\gamma(^{65}\text{Ga})$ (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	Comments
1057.7 3	38 3	4122.1	17/2 ⁺	3064.4	13/2 ⁺	Q	R=1.36 4.
1063.7 3	1.6 2	5496.6	21/2 ⁺	4432.6	17/2 ⁺		
1067.7 3	8.8 7	7361.1	27/2	6293.4	23/2	Q	R=1.43 15.
1075.2 3	8.0 8	1075.2	7/2 ⁻	0.0	3/2 ⁻	Q	R=1.34 9.
1096.0 3	89 8	1286.6	9/2 ⁻	190.5	5/2 ⁻	Q	R=1.30 3.
1097.2 3	4.6 4	3909.7	15/2 ⁽⁺⁾	2812.8	11/2 ⁽⁺⁾		
1121.8#@ 4	0.7 1	3909.7	15/2 ⁽⁺⁾	2787.6	13/2 ⁻		
1125.2 3	1.0 1	7940.0		6814.8	25/2 ⁺		
1135.3 4	1.2 2	3173.0?	11/2 ⁺ ,13/2 ⁺	2037.4	9/2 ⁺		E_γ : a 1135.6 γ placed from 8499, 29/2 ⁽⁻⁾ level in 2001We11 .
1136.0 3	1.7 2	5465.7	19/2	4329.8	17/2 ⁺		R=0.65 17.
1162.6#@ 4	0.6 1	1353.0	(7/2 ⁻)	190.5	5/2 ⁻		
1166.8 3	2.9 3	5496.6	21/2 ⁺	4329.8	17/2 ⁺	Q	R=1.45 27.
1242.1 3	1.1 1	8603.2		7361.1	27/2		
1265.5 3	5.7 5	4329.8	17/2 ⁺	3064.4	13/2 ⁺		
1268.6#@ 4	0.6 1	3735.5?	15/2 ⁽⁻⁾	2466.9?	11/2 ⁽⁻⁾		
1283.5 4	0.4 1	5915.6	21/2 ⁺	4632.1	17/2 ⁺		
1318.1 3	3.0 3	6814.8	25/2 ⁺	5496.6	21/2 ⁺		
1343.8 3	5.7 5	5465.7	19/2	4122.1	17/2 ⁺	D	R=0.73 6.
1352.9 4	3.1 9	1353.0	(7/2 ⁻)	0.0	3/2 ⁻		
1368.2 3	2.8 3	4432.6	17/2 ⁺	3064.4	13/2 ⁺		
1374.5 3	6.9 6	5496.6	21/2 ⁺	4122.1	17/2 ⁺	Q	R=1.36 8.
1391.7 3	1.8 2	2466.9?	11/2 ⁽⁻⁾	1075.2	7/2 ⁻		E_γ : a 1390.0 γ placed from 9332, 33/2 ⁺ level in 2001We11 .
1397.4 3	4.9 5	5943.5	21/2	4546.0	19/2 ⁺	D	R=0.73 10.
1483.0 4	0.6 1	5915.6	21/2 ⁺	4432.6	17/2 ⁺		
1501.0 3	19.8 17	2787.6	13/2 ⁻	1286.6	9/2 ⁻	Q	R=1.33 5.
1526.2 3	8.2 7	2812.8	11/2 ⁽⁺⁾	1286.6	9/2 ⁻	D	R=0.73 7.
1567.7 3	1.3 1	4632.1	17/2 ⁺	3064.4	13/2 ⁺		
1591.8#@ 4	1.0 1	5714.0	19/2,21/2	4122.1	17/2 ⁺		
1784.6 4	0.5 1	6523.2?		4738.6?	19/2 ⁽⁺⁾		E_γ : a 1785.8 γ placed from 4850, 17/2 ⁺ level in 2001We11 .
1793.6 3	3.4 3	5915.6	21/2 ⁺	4122.1	17/2 ⁺	Q	R=1.29 12.
1847.0 3	1.5 2	2037.4	9/2 ⁺	190.5	5/2 ⁻		

[†] From [1999Da10](#).[‡] Assigned by the evaluator based on authors' statements about expected values for stretched quadrupole (Q, $\Delta J=2$) and stretched dipole (D, $\Delta J=1$) transitions; not explicitly given in [1999Da10](#).

Transition not seen in other studies and considered questionable by the evaluator.

@ Placement of transition in the level scheme is uncertain.

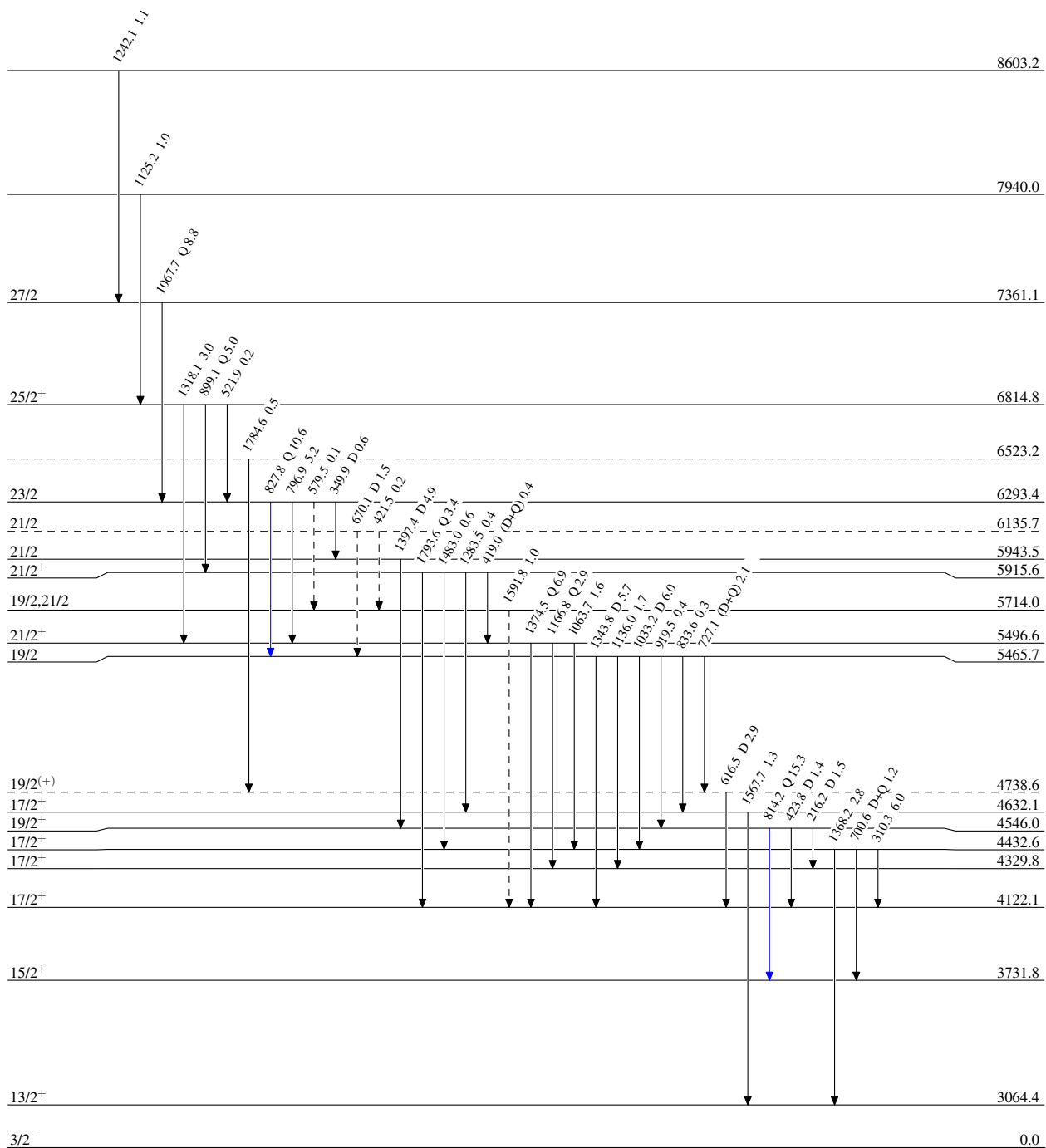
$^{12}\text{C}(^{58}\text{Ni}, \alpha p \gamma)$ 1999Da10

Legend

Level Scheme

Intensities: Relative I_γ

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\cdots$ γ Decay (Uncertain)



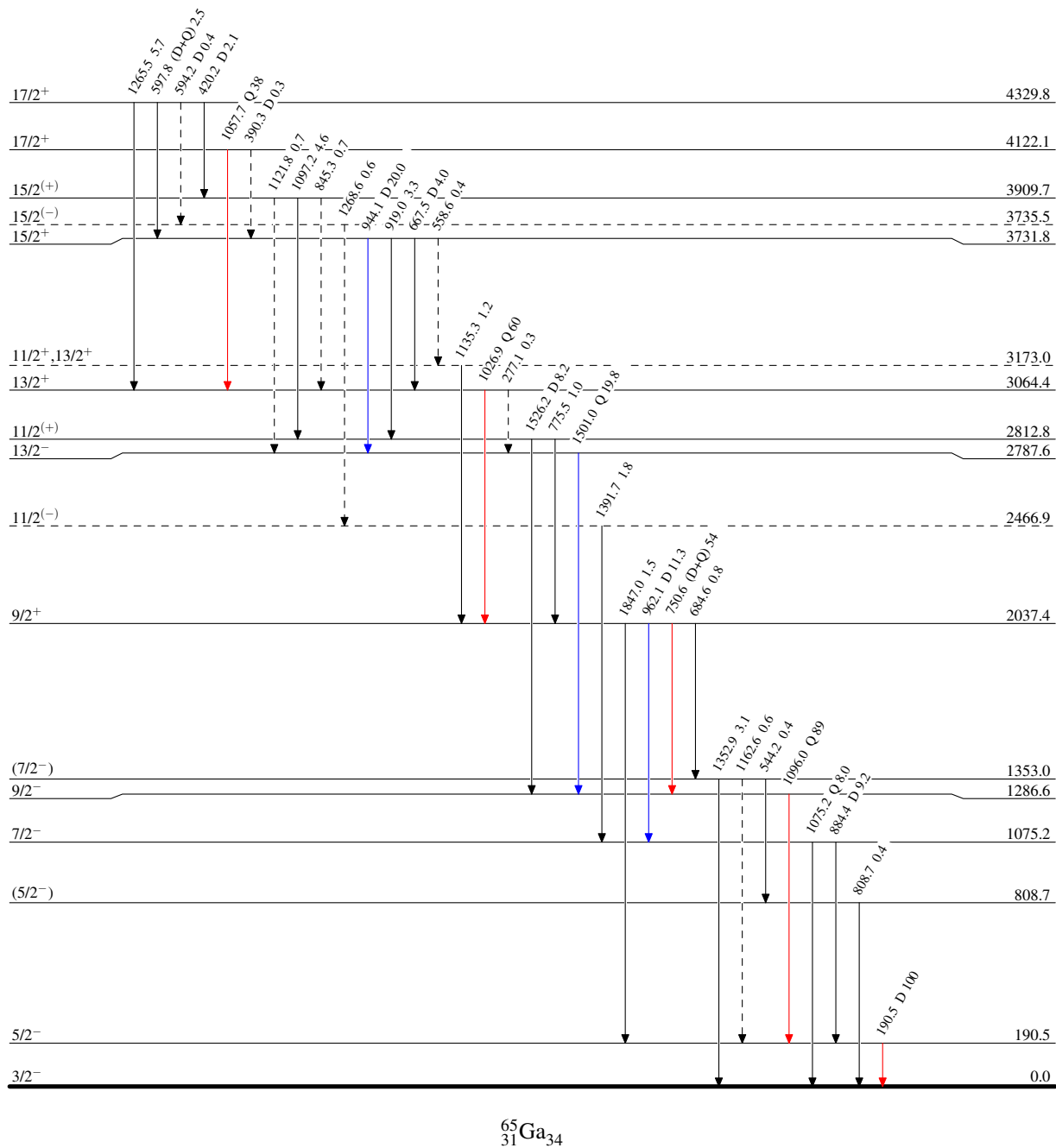
$^{12}\text{C}(^{58}\text{Ni}, \alpha p \gamma)$ 1999Da10

Level Scheme (continued)

Intensities: Relative I_γ

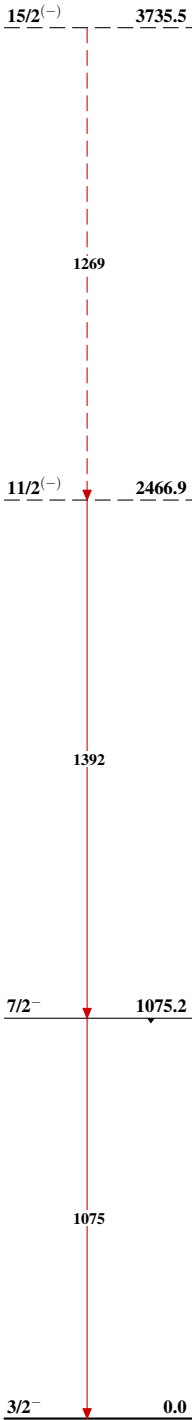
Legend

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$
 $\cdots\cdots\cdots\longrightarrow$ γ Decay (Uncertain)

 $^{65}_{31}\text{Ga}_{34}$

$^{12}\text{C}(^{58}\text{Ni},\alpha\text{p}\gamma)$ 1999Da10

Band(A): Band based on
3/2⁻ g.s



$^{65}_{31}\text{Ga}_{34}$