$^{12}C(^{58}Ni,\alpha n\gamma)$ 1997So06

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

Adapted from the XUNDL dataset of 1997So06, compiled by G. Reed and B. Singh (McMaster) on July 9, 2001.

1997So06: E=261 MeV ^{58}Ni beam was produced from the tandem accelerator of Niels Bohr Institute, Denmark. Target was 1.5 mg/cm^2 ^{12}C. γ rays were detected with the NORDBALL array comprised of 15 BGO-shielded Ge detectors, a 30-element gamma-ray calorimeter of BaF_2 crystals; neutrons were detected with 11 neutron detectors; charged particles were detected with a 4π array consisting of 21 δE type Si detectors. Measured Eγ, $\gamma\gamma$-coin, particle-n-$\gamma\gamma$-coin, and $\gamma(\theta)$ intensity ratios. Deduced levels, J, π, γ-ray multipolarities. Comparisons with interacting boson-fermion model calculations. Details about the data are not available in 1997So06, except for a level scheme.

^{65}Ge Levels

Level scheme here is from Fig.1 of 1997So06, and is partially different (as noted under comments) from that of 1995He27 in ^{40}Ca(^{28}Si,2pnγ) which is more complete with details about the data and is adopted in Adopted Levels.

E(level)[†][‡]	J$^\pi$[#]	Comments
0	$(3/2)^-$	J$^\pi$: from Adopted Levels.
111	$5/2^-$	
605	$5/2^-$	
771[@]	$9/2^-$	E(level): corresponds to 4504, $(17/2^-)$ level in Adopted Levels.
890	$7/2^-$	
1077		
1155	$7/2^-$	
1216	$9/2^+$	
1419[@]	$9/2,13/2^-$	E(level): corresponds to 5153, $(21/2^-)$ level in Adopted Levels.
2080	$13/2^+$	
2122	$11/2^+$	
2838	$13/2^{(+)}$	
3035	15/2	
3334[@]	$15/2^{(-)}$	E(level): corresponds to 3436, $(17/2^+)$ level in Adopted Levels, if the order of 1254γ-1356γ is reversed.
3737	$17/2^{(-)}$	J$^\pi$: $(17/2^+)$ in Adopted Levels.
4690	$19/2^{(-)}$	
5209	$23/2^{(-)}$	
5395[@]	$25/2^{(-)}$	E(level): corresponds to 4691, $(19/2^-)$ level in Adopted Levels.
5671[@]	$25/2^{(-)}$	E(level): corresponds to 5153, $(21/2^-)$ level in Adopted Levels.
6328	$25/2^{(-)}$	
6688		
7088[@]	$(27/2^-)$	E(level): corresponds to 2573, $(11/2^-)$ level in Adopted Levels.
7327[@]	$(27/2^-)$	E(level): corresponds to 4228, $(15/2^-)$ level in Adopted Levels.
7591[@]	$(29/2^-)$	E(level): corresponds to 4691, $(19/2^-)$ level in Adopted Levels.
9206[@]	$(33/2^-)$	E(level): corresponds to 4189, $(15/2^-)$ level in Adopted Levels.

[†] Additional information 1.

[‡] From a least-squares fit to γ-ray energies, assuming $\Delta E\gamma$=1 keV.

[#] As proposed in 1997So06 for excited states, based on their measured $\gamma(\theta)$ intensity ratios and comparisons with theoretical calculations. The firm assignments here will be placed in parentheses when considered in Adopted Levels, if there are no other strong supporting arguments for the firm assignments.

[@] Level is not adopted in Adopted Levels due to different adopted placements of the de-excitation transitions in Adopted Levels.

$^{12}C(^{58}Ni,\alpha n\gamma)$ 1997So06 (continued)

$\gamma(^{65}Ge)$

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
61[@]	1216	$9/2^+$	1155	$7/2^-$	(D)	
111[#]	111	$5/2^-$	0	$(3/2)^-$	(D+Q)	
187[&]	5395	$25/2^{(-)}$	5209	$23/2^{(-)}$	(D+Q)	A 187.0γ placed from 4691, $(19/2^-)$ level in Adopted Levels.
276[a]	5671	$25/2^{(-)}$	5395	$25/2^{(-)}$		
285	890	$7/2^-$	605	$5/2^-$	(D+Q)	
326[@]	1216	$9/2^+$	890	$7/2^-$	(D+Q)	
462[&]	5671	$25/2^{(-)}$	5209	$23/2^{(-)}$	(D+Q)	A 461.8γ placed from 5153, $(21/2^-)$ level in Adopted Levels.
494	605	$5/2^-$	111	$5/2^-$	(D+Q)	
503[&]	7591	$(29/2^-)$	7088	$(27/2^-)$	(D+Q)	A 502.7γ placed from 4691, $(19/2^-)$ level in Adopted Levels.
519[#]	5209	$23/2^{(-)}$	4690	$19/2^{(-)}$	(Q)	
604	605	$5/2^-$	0	$(3/2)^-$		
648[&]	1419	$9/2,13/2^-$	771	$9/2^-$		A 648.8γ placed from 5153, $(21/2^-)$ level in Adopted Levels.
660[&]	771	$9/2^-$	111	$5/2^-$	(Q)	A 660.9γ placed from 4504, $(17/2^-)$ level in Adopted Levels.
702	3737	$17/2^{(-)}$	3035	15/2	(D)	
716	2838	$13/2^{(+)}$	2122	$11/2^+$	(D)	
779[@]	890	$7/2^-$	111	$5/2^-$	(D+Q)	
864[#]	2080	$13/2^+$	1216	$9/2^+$	(Q)	
890[@]	890	$7/2^-$	0	$(3/2)^-$	(Q)	
906	2122	$11/2^+$	1216	$9/2^+$	(D+Q)	
952	4690	$19/2^{(-)}$	3737	$17/2^{(-)}$	(D)	
955	3035	15/2	2080	$13/2^+$	(D+Q)	
966	1077		111	$5/2^-$		
1044[@]	1155	$7/2^-$	111	$5/2^-$	(D+Q)	
1105[#]	1216	$9/2^+$	111	$5/2^-$	(Q)	
1119	6328	$25/2^{(-)}$	5209	$23/2^{(-)}$	(D+Q)	
1155[@]	1155	$7/2^-$	0	$(3/2)^-$	(Q)	
1254[#&]	3334	$15/2^{(-)}$	2080	$13/2^+$	(D)	A 1254.7γ placed from 4691, $(19/2^-)$ level in Adopted Levels.
1356[#&]	4690	$19/2^{(-)}$	3334	$15/2^{(-)}$	(Q)	Placed from 3436, $(17/2^+)$ level in Adopted Levels, where the order of 1254γ-1356γ is reversed.
1417[&]	7088	$(27/2^-)$	5671	$25/2^{(-)}$	(D+Q)	A 1418.1γ placed from 2573, $(11/2^-)$ level in Adopted Levels.
1479	6688		5209	$23/2^{(-)}$		
1615[&]	9206	$(33/2^-)$	7591	$(29/2^-)$	(Q)	A 1615.2γ placed from 4189, $(15/2^-)$ level in Adopted Levels.
1656[&]	7327	$(27/2^-)$	5671	$25/2^{(-)}$	(D+Q)	A 1655.1γ placed from 4228, $(15/2^-)$ level in Adopted Levels.

[†] From Fig.1 of 1997So06. No tabulated data are given in 1997So06.

[‡] Assignments are not explicitly given in 1997So06 but could have been made by authors with their spin assignments based on measured $\gamma(\theta)$, implied by a general statement about parity assignments in 1997So06: definite parities were assigned to the excited states, if one of their deexciting transitions were stretched E2 or mixed M1/E2 transitions, while in the case of pure dipole transitions only tentative parities were ascribed. The assignments quoted here are made by the evaluator based on that statement, but with the magnetic/electric characters being removed because of no supporting data for those characters in 1997So06, and are all placed in parentheses by the evaluator and should be considered as tentative due to lack of the details of the $\gamma(\theta)$ data.

[#] Strong γ-ray, as seen in Fig.1 of 1997So06.

[@] Medium intensity γ-ray, as seen in Fig.1 of 1997So06.

[&] Placed differently in Adopted Gammas.

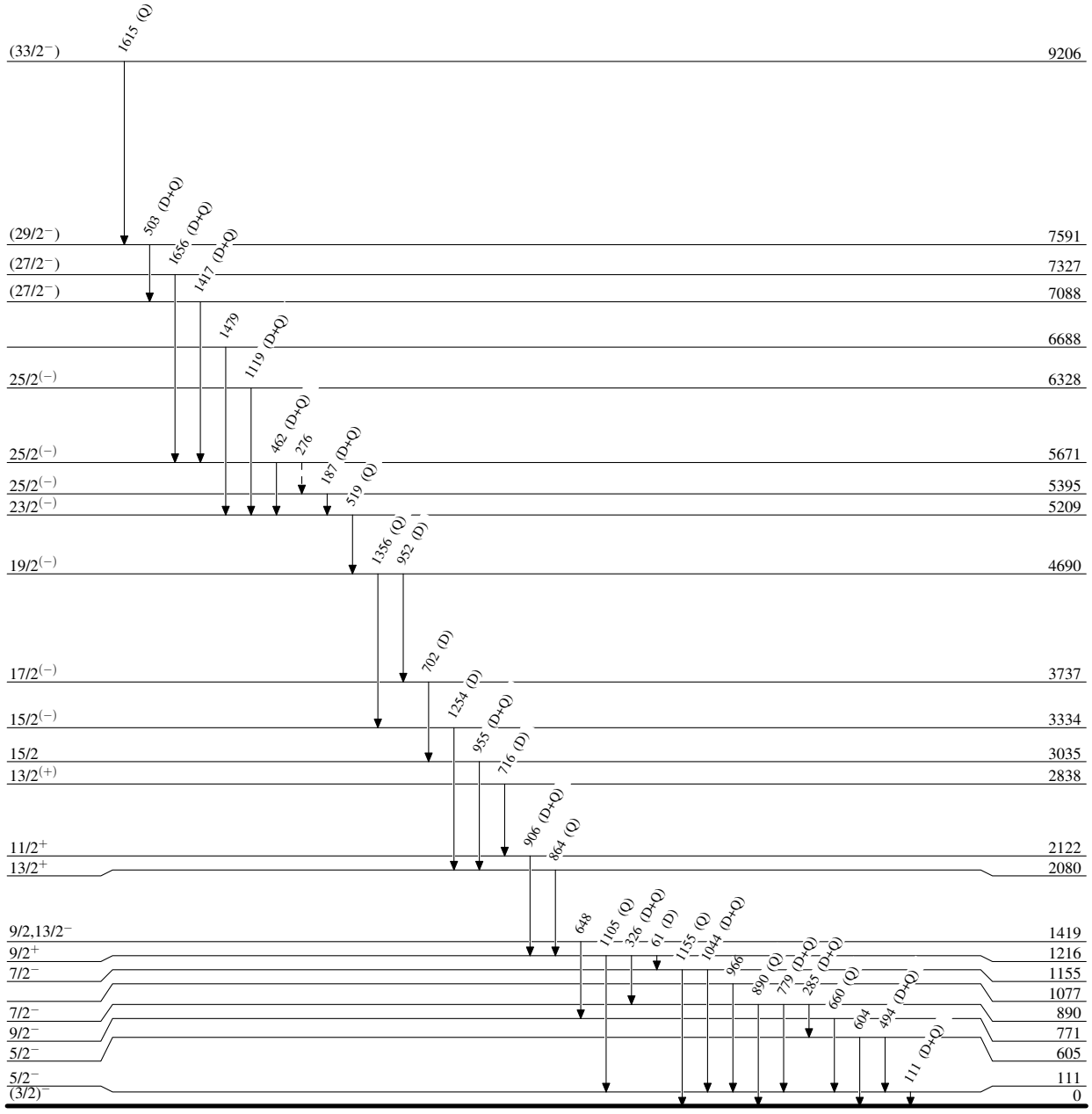
[a] Placement of transition in the level scheme is uncertain.

Legend

$^{12}C(^{58}Ni,\alpha n\gamma)$ **1997So06**

Level Scheme

– – – – – – ► γ Decay (Uncertain)



$^{65}_{32}Ge_{33}$