

⁵⁸Ni(α ,pn γ) 1982Ts04

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli		NDS 114, 1849 (2013)	31-Dec-2012

E α =32 MeV. Measured excit (E α =23-40 MeV), $\gamma\gamma$, $\gamma(\theta)$, DSA. Ge(Li) detectors (1982Ts04). All levels and transitions confirmed at E α = 20 MeV (1989Sc28).
 Other: 1979AIYW.

⁶⁰Cu Levels

All levels have T_{1/2}< 2 ns (from pulsed beam $\gamma(t)$). For wide limits on some levels from DSA, see 1982Ts04.

E(level)	J π^\dagger	E(level)	J π^\dagger	E(level)	J π^\dagger	E(level)	J π^\dagger
0.0	2 ⁺	914.5 2		2349.5 3		3354.5 3	(7 ⁻)
62.3 2	1 ⁺	1421.5 3		2691.7 3	(6 ⁺)	3772.0 3	(7 ⁻)
287.2 2	2 ⁺	1603.6 3	(5 ⁺)	2817.1 4	(6)	4520.9 3	
453.8 2	(3 ⁺)	1778.9 2	(5 ⁺)	3066.6 3		5188.2 3	(9 ⁻)
557.5 2	(4 ⁺)	2026.6 3	(5 ⁺)	3155.5 3	(6 ⁻)		
781.0 2	(3 ⁺)	2197.2 3	(6 ⁺)	3190.8 3	(7 ⁺)		

\dagger From Adopted Levels.

$\gamma(^{60}\text{Cu})$

E _i (level)	J π_i	E γ	I γ^\ddagger	E _f	J π_f	Mult.#	$\delta^\#$	α^\dagger	Comments
62.3	1 ⁺	62.3 2	100	0.0	2 ⁺	D+Q	-0.17 +5-1		
287.2	2 ⁺	224.9 2	70 3	62.3	1 ⁺	D			
		287.2 2	30 3	0.0	2 ⁺	D+Q	+0.17 +2-1		
453.8	(3 ⁺)	166.6 2	1.0 5	287.2	2 ⁺	D+Q	-0.18 +2-5		
		453.8 2	99.0 5	0.0	2 ⁺	D			
557.5	(4 ⁺)	103.7 2	31 3	453.8	(3 ⁺)	D			
		270.3 2	11 1	287.2	2 ⁺	E2@		0.01473	$\alpha(K)=0.01317$ 19; $\alpha(L)=0.001365$ 20; $\alpha(M)=0.000191$ 3; $\alpha(N+..)=5.41\times 10^{-6}$ 8 $\alpha(N)=5.41\times 10^{-6}$ 8
		557.5 2	58 4	0.0	2 ⁺	E2@		0.001298 19	$\alpha=0.001298$ 19; $\alpha(K)=0.001164$ 17; $\alpha(L)=0.0001171$ 17; $\alpha(M)=1.643\times 10^{-5}$ 23 $\alpha(N)=4.89\times 10^{-7}$ 7
781.0	(3 ⁺)	327.2 2	45 6	453.8	(3 ⁺)				
		781.0 2	55 6	0.0	2 ⁺	D+Q	-0.7 +5-10		
914.5		357.0 2	33 15	557.5	(4 ⁺)				
		460.7 2	67 15	453.8	(3 ⁺)				
1421.5		967.7 2	100	453.8	(3 ⁺)				
1603.6	(5 ⁺)	1046.1 2	100	557.5	(4 ⁺)	D+Q	-0.9 1		
1778.9	(5 ⁺)	1221.4 2		557.5	(4 ⁺)				
		1325.1 2		453.8	(3 ⁺)	E2@		0.0001757 25	$\alpha=0.0001757$ 25; $\alpha(K)=0.0001271$ 18; $\alpha(L)=1.254\times 10^{-5}$ 18; $\alpha(M)=1.763\times 10^{-6}$ 25 $\alpha(N)=5.39\times 10^{-8}$ 8; $\alpha(IPF)=3.42\times 10^{-5}$ 5
2026.6	(5 ⁺)	1469.1 2	100	557.5	(4 ⁺)	D+Q	-1.7 +8-5		

Continued on next page (footnotes at end of table)

$^{58}\text{Ni}(\alpha, \text{pn}\gamma)$ **1982Ts04 (continued)** $\gamma(^{60}\text{Cu})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	I_γ^\ddagger	E_f	J_f^π	Mult. [#]	$\delta^\#$	α^\dagger	Comments
2197.2	(6 ⁺)	1639.7 2	100	557.5	(4 ⁺)	E2 [@]		0.000236 4	$\alpha=0.000236$ 4; $\alpha(\text{K})=8.23\times 10^{-5}$ 12; $\alpha(\text{L})=8.10\times 10^{-6}$ 12; $\alpha(\text{M})=1.138\times 10^{-6}$ 16; $\alpha(\text{N}+..)=0.0001445$ $\alpha(\text{N})=3.49\times 10^{-8}$ 5; $\alpha(\text{IPF})=0.0001445$ 21
2349.5		1792.0 2	100	557.5	(4 ⁺)				
2691.7	(6 ⁺)	1088.1 2	100	1603.6	(5 ⁺)	D+Q	-1.2 5		
2817.1	(6)	790.5 2	100	2026.6	(5 ⁺)	D			
3066.6		2509.0 2	100	557.5	(4 ⁺)				
3155.5	(6 ⁻)	1551.9 2	100	1603.6	(5 ⁺)	D			
3190.8	(7 ⁺)	1587.2 2	100	1603.6	(5 ⁺)	E2 [@]		0.000220 3	$\alpha=0.000220$ 3; $\alpha(\text{K})=8.78\times 10^{-5}$ 13; $\alpha(\text{L})=8.64\times 10^{-6}$ 12; $\alpha(\text{M})=1.214\times 10^{-6}$ 17; $\alpha(\text{N}+..)=0.0001219$ $\alpha(\text{N})=3.72\times 10^{-8}$ 6; $\alpha(\text{IPF})=0.0001218$ 17
3354.5	(7 ⁻)	1157.3 2	100	2197.2	(6 ⁺)	D			
3772.0	(7 ⁻)	417.5 2	47 5	3354.5	(7 ⁻)	D+Q	-0.46 +5-3		
		616.5 2	53 5	3155.5	(6 ⁻)				
4520.9		1166.3 2		3354.5	(7 ⁻)				
		1365.3 2		3155.5	(6 ⁻)				
5188.2	(9 ⁻)	1416.1 2	54 7	3772.0	(7 ⁻)	Q+O	-0.18 2		
		1833.6 2	46 7	3354.5	(7 ⁻)	E2 [@]		0.000306 5	$\alpha=0.000306$ 5; $\alpha(\text{K})=6.64\times 10^{-5}$ 10; $\alpha(\text{L})=6.52\times 10^{-6}$ 10; $\alpha(\text{M})=9.17\times 10^{-7}$ 13; $\alpha(\text{N}+..)=0.000232$ 4 $\alpha(\text{N})=2.82\times 10^{-8}$ 4; $\alpha(\text{IPF})=0.000232$ 4

[†] Additional information 1.

[‡] % Photon branching from each level is given (1982Ts04).

[#] From analysis of $\gamma(\theta)$, except as noted otherwise.

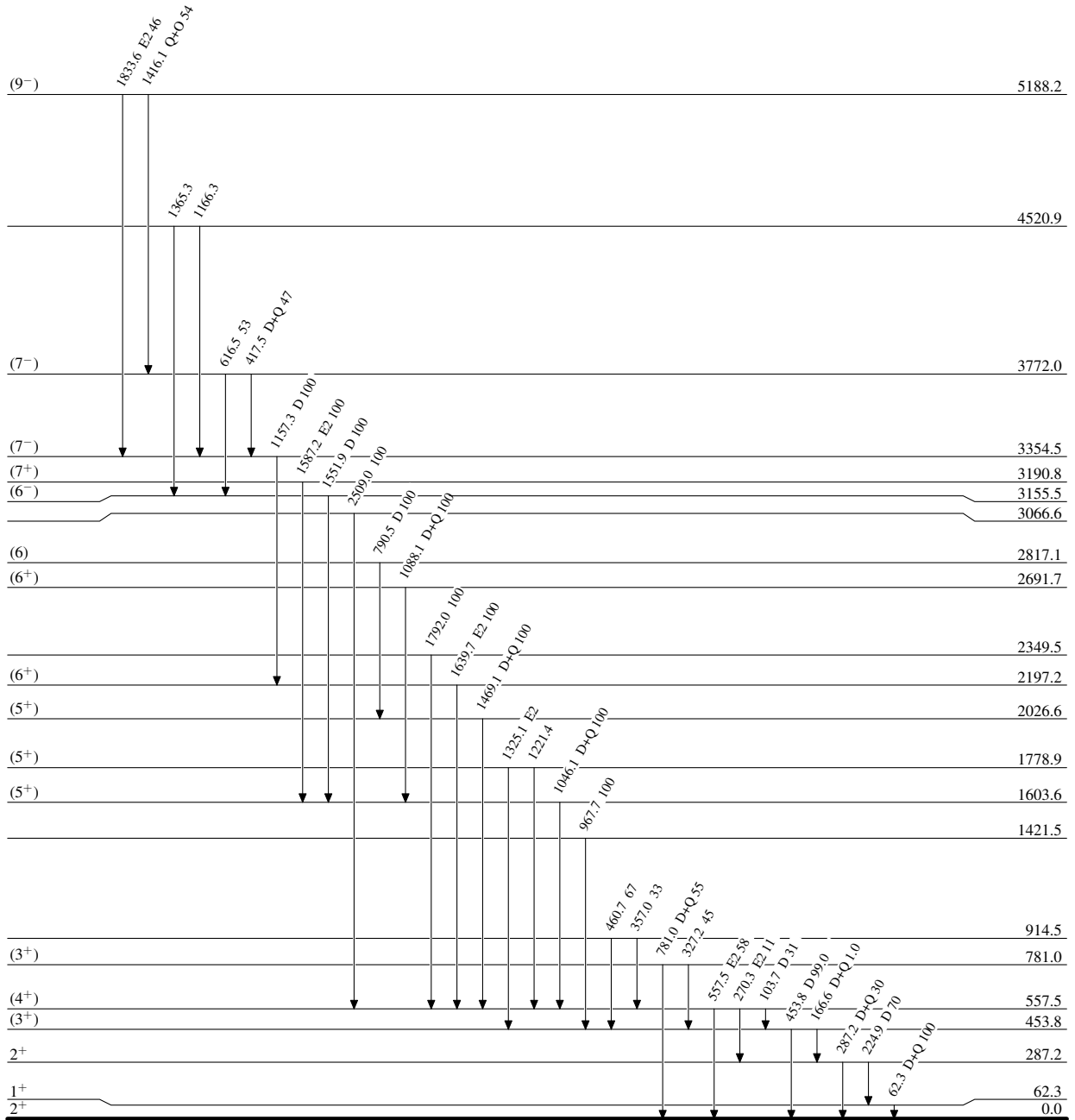
[@] Q from $\gamma(\theta)$; M2 excluded based on $T_{1/2}$ not observed electronically.

^x γ ray not placed in level scheme.

$^{58}\text{Ni}(\alpha, \text{pn}\gamma)$ 1982Ts04

Level Scheme

Intensities: % photon branching from each level

 $^{60}_{29}\text{Cu}_{31}$