^{60}Ni(p,γ):resonances

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Kazimierz Zuber, Balraj Singh	NDS 125, 1 (2015)	25-Jan-2015

1990Sz01: E=3.67-3.83 MeV. Measured σ(E), $\gamma(\theta)$; deduced IAS. See also 1993Ca12 for the assignment of spins of resonances deduced using multi-dimensional scaling method for γ-ray data.
1989Ti01: E=1-4 MeV. Measured γ-ray yields, resonance strengths.
1989Iz01, 1989IzZZ: E=5 MeV. Measured $\gamma(\theta)$.
1988Iz01: E=1.931-2.455 MeV. Measured γ spectra, $\gamma(\theta)$.
1983Si06: E=1.57-3.45 MeV, measured γ-multiplicity, σ(E). See also 1989Si25 for analysis of data.
1981BY03: E=1.57-1.85 MeV, measured Eγ, Iγ, $\gamma(\theta)$.
1979Bo09: E=1.80-2.90 MeV. Measured σ(E), Eγ, Iγ.
1977Ho29: E=3.5-4.1 MeV, measured σ(E).
1976Be30: E=3.69-3.79 MeV, measured Eγ, Iγ, absolute γ yields.
1976Kr19: E=1.57-1.90 MeV, measured Eγ, $\gamma(\theta)$.
1975Kr06: E<5 MeV, measured σ(E).
1975Kr05: E=1674, 1856, 1873 keV, measured σ(Eγ), deduced B(M1).
1974Kr26: E=1588, 1599, 1605, 1620 keV, measured Eγ, Iγ.
1974Tr03: E=1840-1880, 2220-2300 keV, measured Eγ, $\gamma(\theta)$, σ.
1974Ad06: E=3.67-3.95 MeV, measured Eγ, Iγ, $\gamma(\theta)$, σ(E).
1973Tr06: E=1.5-1.9 MeV, measured Eγ, $\gamma(\theta)$, σ(E).
1972Sz01: Measured σ(E).
1971Ki29: E=1588-1620 keV, measured Eγ, $\gamma(\theta)$, σ(E).
1965Go02: E=1588, 1599, 1620 keV; measured p$\gamma\gamma(\theta)$.
1957Bu64: E=0.7-1.8 MeV. 54 proton resonances from 725 to 1793 keV. Measured yields, primary and secondary Eγ, Iγ.
1989Iz01, 1988Iz01, 1983Si06, 1981By03, 1976Kr19, 1975Kr06, 1975Kr05, and 1974Kr26 are from the same group.
1974Tr03 and 1973Tr06 are from the same group.
1965Go02 and 1957Bu64 are from the same group.
Measured σ(E), scin. Measured Eγ, Iγ, semi, enriched target. E(p)=1800-2900 (1979Bo09), E(p)=3690-3790 (1976Be30), E=1930-2450 (1988Iz01), E=1020-4420 (1989Ti01), E=1599-3407 (1983Si06).
Measured σ(E), scin. Measured Eγ, Iγ, $\gamma(\theta)$, semi, enriched target. E(p)=1550-1950 (1971Ki29,1973Tr06,1974Tr03,1974Kr26,1975Kr05,1975Kr06,1976Kr19), E(p)=2220-2300 (1974Tr03), E(p)=3620-3830 (1972Sz01,1974Ad06,1977Ho29,1990Sz01), E=1000-4000 (1989Ti01).
Measured σ(E), Eγ, Iγ, $\gamma(\theta)$, scin. E(p)=700-1800 (1957Bu64), E=1930-2450 (1988Iz01).
Measured $\gamma\gamma(\theta)$, scin (1965Go02).
Measured intermediate structure existence: E=1930-2450 (1989Si25,1989IzZZ,1989Iz01,1988Iz01).
1993Ca12: assigned spins to proton resonances using the method of multidimensional scaling (MDS) using γ decay branching ratios from earlier data.

^{61}Cu Levels

For the unstatistical effects: E=1588-1620 (1986Iz01).
For thick target yields of resonances between 700 and 1800 keV, see 1957Bu64. The values reported on resonance strength are inconsistent, see 1972Sz01, 1973Tr06, 1974Ad06, 1974Tr03, 1975Kr06, 1976Be30, 1979Bo09.

E(level)[†]	J$^\pi$[‡]
0	3/2$^-$[e]
475.84[@] *19*	1/2$^-$[e]
970.00[@] *22*	5/2$^-$[e]
1310.88[@] *24*	7/2$^-$[i]
1393.94[&] *25*	5/2$^-$[e]

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^{60}Ni(p,γ):resonances (continued)

^{61}Cu Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(p)(lab)
1661.09& 22	3/2−e	5513.3 11		725
1733.1@ 3	7/2−i	5680.4 22		895
1904.4& 3	5/2−e	5812.2 22		1029
1933.0 3	3/2−e	5848.6 22		1066
1943.2h 4	7/2−i	5860.4 22		1078
2088.2& 3	1/2−e	5913.5 22		1132
2203.2 4	5/2−	5947.9l 22		1167
2295.6@h 4	9/2−i	5977.4 22		1197
2336.9h 5	9/2−i	5989.2 22		1209
2358.1& 3	3/2−e	6018.7 22		1239
2399.7h 4	7/2−i	6026.6 22		1247
2473.0& 3	3/2−e	6091.5 22		1313
2583.8& 4	3/2,5/2	6097.4 22		1319
2613.1h 6	9/2−i	6101.3 22		1323
2627.2h 6	11/2−#	6109.2 22		1331
2684.0 4	3/2−#	6121.0 22		1343
2721.2@fh 5	9/2+fi	6124.9 22		1347
2722.2 4	7/2−#	6148.5 22		1371
2791.9& 4	5/2−#	6158.4 22		1381
2841.2 4	1/2−,3/2−#	6191.8 22		1415
2856.2& 4	1/2−,3/2−#	6207.5 22		1431
2932.1 4	3/2−#	6227.2 22	(1/2)	1451
3002.4j 4	5/2	6237.0 22		1461
3016.6j 10	11/2−#	6241.0 22		1465
3017.4& 3	3/2−e	6258.7 22		1483
3042.0? 7		6266.5 22		1491
3065.1 3	3/2−#	6290.1 22		1515
3092.1 4	3/2−#	6294.1 22		1519
3262.7h 8	11/2−#	6303.9 22		1529
3277.1 4		6312.8 22		1538
3358.2 6		6340.3 22		1566
3411.7 7		6351.1 5	(3/2)	1577
3430.3 6		6361.9a 3	3/2	1588
3437.1? 11		6372.4a 3	3/2	1599
3524.3 6		6378.5a 3	3/2	1605
3590.1? 10		6393.2a 3	3/2	1620
3612.6? 10		6412.1 22		1639
3706.1 6		6416.0 22		1643
3730.1 5		6421.9 22		1649
3790.2 5		6428.7 5	(1/2)	1656
3947.0? 6		6441.3b 4	5/2	1669
3980.6@j 5		6446.1b 3	5/2	1674
4132.8f 4	9/2+fi	6451.4 22		1679
4296.1? 10		6457.6b 6	5/2k	1685
4333.0@j 5		6466.2 4	3/2	1694
4382.0?j 8		6470.1 22		1698
5126.3@j 5		6482.9 22		1711
5251.7@j 4		6492.7 22		1721
5465		6505.6 5	3/2	1734

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^{60}Ni(p,γ):resonances (continued)

^{61}Cu Levels (continued)

E(level)[†]	Jπ[‡]	E(p)(lab)	E(level)[†]	Jπ[‡]	E(p)(lab)
6510.4 *22*		1739	7510.0		2755
6528.1 *22*	3/2	1757	7549.4		2795
6535.1 *6*	3/2,(5/2)	1764	7559.2		2805
6541.0 *6*	3/2	1770	7561.2		2807
6553.7 *22*		1783	7572.0		2818
6563.5 *7*	3/2	1793	7645.8		2893
6584.3 *4*	3/2[k]	1814	7647.7		2895
6585.2[m] *10*	3/2,(5/2)	1815	7847.1[g] *5*		3098
6604.3[m] *5*	3/2	1835	8131.9[g] *5*		3385
6619.3 *3*	3/2	1850	8149.4?[go] *5*		3407
6627.2[o] *3*	(1/2)	1858	8194.4[g] *5*		3450
6629.8		1860	8431.4 *7*	5/2[k]	3692
6645.3[o] *4*	(1/2)	1876	8436.4 *7*	1/2[k]	3697
6678.4 *3*	1/2[k]	1910	8440.0 *5*	1/2[k]	3700
6693.8		1925	8442.8 *7*	3/2,5/2[k]	3703
6706.5		1938	8446.0[c] *5*	[n]	3706
6711.9[d] *5*	3/2$^-$[e]	1944	8447.1[ch] *5*	9/2$^+$[n]	3710.0
6739.0[d] *5*	3/2$^-$,5/2$^-$[e]	1972	8448.2[ch] *4*	9/2$^+$[in]	3714.4
6762.6[d]	3/2$^-$,5/2$^-$[e]	1995	8454.5[ch] *4*	9/2$^+$[in]	3717.4
6799.0		2032	8455.1	1/2,3/2[k]	3716
6802.3[cd] *4*	1/2$^-$,3/2[en]	2035	8458.6[ch] *4*	9/2$^+$[in]	3721.0
6813.7[d]	3/2,5/2,(1/2)[e]	2047	8464.4[ch] *4*	9/2$^+$[in]	3727.6
6915.0[d] *6*	(3/2$^-$)[e]	2150	8465.9[h] *4*	9/2$^+$[i]	3728.9
6937.4[d] *5*	3/2$^-$[e]	2173	8466.0	1/2[k]	3727
7010.7[o] *3*	3/2$^-$[e]	2248	8469.5 *6*	5/2[k]	3730
7016.3[d] *6*	3/2$^-$[e]	2253	8473.1[ch] *4*	9/2$^+$[in]	3736.7
7025.4 *3*	5/2	2263	8476.3[ch] *4*	9/2$^+$[in]	3738.8
7044.7[d] *6*	(1/2),3/2$^-$[e]	2283	8478.3[ch] *4*	9/2$^+$[in]	3741.6
7054.7[l]		2292	8481.5[ch] *5*	9/2$^+$[in]	3744.4
7059.8[do] *5*	3/2$^-$[e]	2295	8481.7	3/2[k]	3743
7107.3 *4*	1/2[k]	2346	8485.0[ch] *4*	9/2$^+$[in]	3748.5
7120.8[d] *7*	3/2$^-$[e]	2359	8489.9 *6*	1/2[k]	3751
7159[d] *5*	5/2[e]	2398	8492.4 *5*	3/2[k]	3754
7201.3[d] *5*	(3/2$^-$)[e]	2442	8499.9 *6*	5/2[k]	3761
7214.3[d] *5*	3/2$^-$[e]	2455	8503.7 *10*		3765
7223.2 *4*	1/2[k]	2464	8507.3 *10*	1/2[k]	3769
7262.3 *3*	1/2,3/2[k]	2504	8508.1 *5*	1/2[k]	3770
7283.2 *3*	1/2,3/2[k]	2525	8509.9 *5*		3772
7313.3		2555	8515.4 *10*		3777
7319.2		2561	8522.6 *7*	1/2,3/2[k]	3784
7428.4		2672			

[†] From 1957Bu64, 1973Tr06, 1974Tr03, 1974Kr26, 1976Be30, 1979Bo09, except as noted. For resonance state, E(level) are deduced from S(p)+E(p), where E(p) is proton energy in c.m. system, S(p)=4800.3 *10* (2012Wa38). High-lying levels which are reported at only one resonance are treated as questionable.

[‡] J from $\gamma(\theta)$, except as noted.

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^{60}Ni(p,γ):resonances (continued)

^{61}Cu Levels (continued)

From Adopted Levels.
@ Weighted average of 1971Ki29, 1974Ad06 and 1976Be30.
& From 1971Ki29.
[a] Probably a fragment of the analog of the 3/2$^-$ g.s. in ^{61}Ni.
[b] Possibly a fragment of the analog of the 67-keV, 5/2$^-$, state in ^{61}Ni.
[c] A fragment of the analog of the 2122-keV, 9/2$^+$, state in ^{61}Ni.
[d] From 1988Iz01.
[e] From $\gamma(\theta)$ (1988Iz01).
[f] Antianalog state of 9/2$^+$ analog state.
[g] From 1983Si06.
[h] From 1990Sz01.
[i] From $\gamma(\theta)$ and isobaric analog resonance analysis (1990Sz01).
[j] Seen also by 1990Sz01.
[k] From the method of multidimensional scaling (MDS) using γ decay branching from earlier data (1993Ca12).
[l] E(level) probably a doublet.
[m] E(level) from 1981By03.
[n] J=1/2 from (1993Ca12), MDS method.
[o] E=6627.2 keV,probably a fragment of the analog of the 283 keV, 1/2$^-$,state in ^{61}Ni. E=6645.3 keV, there is probably a doublet at 1876 keV. The dominant component is probably a fragment of the analog of the 283 keV, 1/2$^-$, state in ^{61}Ni. E=7010.7 keV, probably a fragment of the analog of the 656 keV, 1/2$^-$,state in ^{61}Ni. E(p)=2242 *5* (1988Iz01). E=7059.8 keV, E(p)=2299 in Table 3 of 1988Iz01. E=8149.4 keV, may be a misprint in Table 1 of 1983Si06.

$\gamma(^{61}$Cu)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]	δ[g]	Comments
475.84	1/2$^-$	475.8	100	0	3/2$^-$			
970.00	5/2$^-$	969.8	100	0	3/2$^-$	(M1+E2)	−0.35[i] *3*	
1310.88	7/2$^-$	340.5	4.2[a] *9*	970.00	5/2$^-$			
		1310.3	95.8[a] *9*	0	3/2$^-$			
1393.94	5/2$^-$	424.0	1[b]	970.00	5/2$^-$			
		918.0	8[b]	475.84	1/2$^-$			
		1393.8	91[b]	0	3/2$^-$	(M1+E2)	−3.78[i] *+13−15*	
1661.09	3/2$^-$	690.7	17[b]	970.00	5/2$^-$			
		1184.7	22[b]	475.84	1/2$^-$			
		1660.5	61[b]	0	3/2$^-$	(M1+E2)		δ: +0.29 to +1.68 (1965Go02) for J=(3/2$^-$).
1733.1	7/2$^-$	422.1	25[a] *4*	1310.88	7/2$^-$			
		1732.4	75[a] *4*	0	3/2$^-$			
1904.4	5/2$^-$	594.0	37[b]	1310.88	7/2$^-$			
		934.5	36[b]	970.00	5/2$^-$			
		1904.3	27[b]	0	3/2$^-$			
1933.0	3/2$^-$	1933.0	100[b]	0	3/2$^-$	(M1+E2)		δ: +0.08 to +0.42 or +1.2 to +2.5 (1965Go02).
2088.2	1/2$^-$	1612.6	39[b]	475.84	1/2$^-$			
		2088.4	61[b]	0	3/2$^-$			
2203.2	5/2$^-$	893	27[b]	1310.88	7/2$^-$			
		1233	73[b]	970.00	5/2$^-$			
2358.1	3/2$^-$	425	20[b]	1933.0	3/2$^-$			
		697.4	14[b]	1661.09	3/2$^-$			

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^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]	δ[g]
2358.1	3/2$^-$	1882.1	30[b]	475.84	1/2$^-$		
		2357.9	36[b]	0	3/2$^-$		
2473.0	3/2$^-$	1503.1	22[b]	970.00	5/2$^-$		
		1997.1	78[b]	475.84	1/2$^-$		
2583.8	3/2,5/2	851.1	26[b]	1733.1	7/2$^-$		
		2583.5	74[b]	0	3/2$^-$		
2684.0	3/2$^-$	2208	54[b]	475.84	1/2$^-$		
		2684	46[b]	0	3/2$^-$		
2721.2	9/2$^+$	987.8	34.3[c] *15*	1733.1	7/2$^-$		
		1409.9	65.7[c] *15*	1310.88	7/2$^-$		
2791.9	5/2$^-$	1481.3	40[b]	1310.88	7/2$^-$		
		2791.6	60[b]	0	3/2$^-$		
2856.2	1/2$^-$,3/2$^-$	2856.1	100[b]	0	3/2$^-$		
3002.4	5/2	3002	100[b]	0	3/2$^-$		
3016.6	11/2$^-$	1705.7	100[c]	1310.88	7/2$^-$		
3017.4	3/2$^-$	2541.8	87[b]	475.84	1/2$^-$		
		3017.6	13[b]	0	3/2$^-$		
3042.0?		2566[j]	62[b]	475.84	1/2$^-$		
		3042[j]	38[b]	0	3/2$^-$		
3065.1	3/2$^-$	3065	100[b]	0	3/2$^-$		
3092.1	3/2$^-$	3092	100[b]	0	3/2$^-$		
3277.1		3277	100[d]	0	3/2$^-$		
3790.2		2820	[d]	970.00	5/2$^-$		
3947.0?		2553[j]	[d]	1393.94	5/2$^-$		
		3471[j]	[d]	475.84	1/2$^-$		
4132.8	9/2$^+$	2400.1	65.2[c] *18*	1733.1	7/2$^-$		
		2822.2	34.8[c] *18*	1310.88	7/2$^-$		
4333.0		3021.8[j]	100[c]	1310.88	7/2$^-$		
5251.7		2530.5	53[c] *4*	2721.2	9/2$^+$		
		4280.9	47[c] *4*	970.00	5/2$^-$		
6351.1	(3/2)	3992.7		2358.1	3/2$^-$		
		4690.1		1661.09	3/2$^-$	D+Q	0.58 *+24−10*
		5380.8		970.00	5/2$^-$		
		5874.8		475.84	1/2$^-$	D+Q	0.054 *+54−14*
		6350.6		0	3/2$^-$	D+Q	0.56 *10*
6361.9	3/2	2632	5 *1*	3730.1			
		2656	5 *1*	3706.1			
		2950	6 *1*	3411.7			
		3270[j]		3092.1	3/2$^-$		
		3296[j]		3065.1	3/2$^-$		
		3343.9	8 *1*	3017.4	3/2$^-$		
		3360[j]		3002.4	5/2		
		3505.4	6 *1*	2856.2	1/2$^-$,3/2$^-$		
		3678[j]		2684.0	3/2$^-$	D+Q	0.045 *+14−4*
		3778.0	<1	2583.8	3/2,5/2		
		3888.6	8 *1*	2473.0	3/2$^-$	D+Q	0.18 *6*
		4003.6	5 *1*	2358.1	3/2$^-$	D+Q	0.37 *+20−15*
		4273.1	6 *1*	2088.2	1/2$^-$	D+Q	<0.12
		4701.0	<1	1661.09	3/2$^-$		

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^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]	δ[g]
6361.9	3/2	4967.7	19 *1*	1393.94	5/2$^-$	D+Q	0.17 *7*
		5391.7	8 *1*	970.00	5/2$^-$	D+Q	0.13 *11*
		5885.7	3 *1*	475.84	1/2$^-$		
		6361.5	21 *2*	0	3/2$^-$	D+Q	0.15 *3*
6372.4	3/2	2642	3 *1*	3730.1			
		2666	3 *1*	3706.1			
		2848	2 *1*	3524.3			
		2942	7 *1*	3430.3			
		3280[j]		3092.1	3/2$^-$		
		3307[j]		3065.1	3/2$^-$		
		3354.7	2 *1*	3017.4	3/2$^-$		
		3516.2[j]		2856.2	1/2$^-$,3/2$^-$		
		3688[j]		2684.0	3/2$^-$	D+Q	0.30 *10*
		3788.8	3 *1*	2583.8	3/2,5/2		
		3899.4	3 *1*	2473.0	3/2$^-$	D+Q	0.50 *10*
		4169	5 *1*	2203.2	5/2$^-$	D+Q	<0.3
		4283.9	5 *1*	2088.2	1/2$^-$	D(+Q)	0.00 *4*
		4711.8	3 *1*	1661.09	3/2$^-$		
		4978.5	18 *1*	1393.94	5/2$^-$	D+Q	0.13 *4*
		5402.5	11 *1*	970.00	5/2$^-$	D+Q	0.17 *7*
		5896.5	11 *1*	475.84	1/2$^-$	D+Q	0.20 *12*
		6372.3	24 *2*	0	3/2$^-$	D+Q	0.20 *1*
6378.5	3/2	2854	3 *1*	3524.3			
		3537	1 *1*	2841.2	1/2$^-$,3/2$^-$		
		3586.6	2 *1*	2791.9	5/2$^-$		
		3794.7	2 *1*	2583.8	3/2,5/2		
		3905.3	2 *1*	2473.0	3/2$^-$	D+Q	0.20 *10*
		4289.8	4 *1*	2088.2	1/2$^-$	D+Q	0.03 *1*
		4473.9[j]		1904.4	5/2$^-$		
		4717.7	1 *1*	1661.09	3/2$^-$		
		4984.4	15 *1*	1393.94	5/2$^-$	D(+Q)	0.00 *5*
		5408.4	5 *1*	970.00	5/2$^-$	D(+Q)	0.03 *10*
		5902.4	9 *1*	475.84	1/2$^-$		
		6378.2	54 *2*	0	3/2$^-$	D+Q	0.10 *2*
6393.2	3/2	2663	2 *1*	3730.1			
		2687	5 *1*	3706.1			
		2869	1 *1*	3524.3			
		2963	1 *1*	3430.3			
		3301	3 *1*	3092.1	3/2$^-$		
		3328	<1	3065.1	3/2$^-$		
		3375.3	1 *1*	3017.4	3/2$^-$		
		3391[j]		3002.4	5/2		
		3536.8	4 *1*	2856.2	1/2$^-$,3/2$^-$		
		3552	<1	2841.2	1/2$^-$,3/2$^-$		
		3709[j]		2684.0	3/2$^-$	D+Q	0.40 *15*
		4035.0[j]		2358.1	3/2$^-$	D+Q	0.16 *10*
		4304.5	8 *1*	2088.2	1/2$^-$	D(+Q)	0.00 *10*
		4488.6	1 *1*	1904.4	5/2$^-$		
		4732.4	<1	1661.09	3/2$^-$		
		4999.1	18 *1*	1393.94	5/2$^-$	D(+Q)	0.00 *10*
		5423.1	1 *1*	970.00	5/2$^-$	D(+Q)	0.00 *22*
		6392.9	54 *2*	0	3/2$^-$	D+Q	0.16 *1*
6428.7	(1/2)	3955.5	1 *1*	2473.0	3/2$^-$		
		4070.5	5 *1*	2358.1	3/2$^-$		
		4340.0	2 *1*	2088.2	1/2$^-$		

Continued on next page (footnotes at end of table)

^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]	δ[g]
6428.7	(1/2)	5952.6	22 *2*	475.84	1/2$^-$		
		6428.4	70 *2*	0	3/2$^-$		
6441.3	5/2	3968.2	3 *1*	2473.0	3/2$^-$		
		4497	4 *1*	1943.2	7/2$^-$		
		5047.3	5 *1*	1393.94	5/2$^-$		
		5130.8	8 *1*	1310.88	7/2$^-$		
		5471.3	12 *1*	970.00	5/2$^-$		
		6441.1	68 *2*	0	3/2$^-$		
6446.1	5/2	3381	1 *1*	3065.1	3/2$^-$		
		3444	1 *1*	3002.4	5/2	D+Q	0.1
		3719	13 *1*	2722.2	7/2$^-$		
		3973.2	10 *1*	2473.0	3/2$^-$	D(+Q)	0.0
		4243	18 *1*	2203.2	5/2$^-$	D+Q	0.2
		4502	1 *1*	1943.2	7/2$^-$		
		4513	1 *1*	1933.0	3/2$^-$		
		4713.7	1 *1*	1733.1	7/2$^-$		
		4785.6[j]		1661.09	3/2$^-$		
		5052.3	5 *1*	1393.94	5/2$^-$	D+Q	0.4
		5135.8	36 *2*	1310.88	7/2$^-$	D+Q	0.05
		5476.3	14 *1*	970.00	5/2$^-$	D+Q	0.31
		5970.3[j]		475.84	1/2$^-$		
		6446.1[j]		0	3/2$^-$	D(+Q)	0.0
6457.6	5/2	5147	32 *2*	1310.88	7/2$^-$		
		5487	8 *1*	970.00	5/2$^-$		
		6457	60 *2*	0	3/2$^-$		
6466.2	3/2	3674.1	2 *1*	2791.9	5/2$^-$		
		3882.2	2 *1*	2583.8	3/2,5/2		
		4805.2	4 *1*	1661.09	3/2$^-$	D+Q	0.17 *8*
		5495.9	11 *1*	970.00	5/2$^-$	D+Q	0.07 *8*
		5989.9	27 *2*	475.84	1/2$^-$	D(+Q)	0.01 *4*
		6465.7	52 *2*	0	3/2$^-$	D+Q	0.07 *2*
6505.6	3/2	4844.6		1661.09	3/2$^-$	D+Q	0.35 *18*
		5111.3		1393.94	5/2$^-$	D(+Q)	0.06 *16*
		5535.3		970.00	5/2$^-$	D+Q	0.16 *18*
		6029.3		475.84	1/2$^-$	D(+Q)	0.05 *10*
		6505.1		0	3/2$^-$	D+Q	0.51 *6*
6535.1	3/2,(5/2)	4874.1		1661.09	3/2$^-$	D+Q	0.08 *6*
		6058.8		475.84	1/2$^-$	D+Q	0.39 *4*
		6534.6		0	3/2$^-$	D+Q	0.19 *3*
6541.0	3/2	4880.0		1661.09	3/2$^-$	D+Q	0.32 *7*
		6064.7		475.84	1/2$^-$	D+Q	0.08 *7*
		6540.5		0	3/2$^-$	D+Q	0.02 *2*
6563.5	3/2	6087.3		475.84	1/2$^-$	D+Q	0.14 *7*
		6563.1		0	3/2$^-$	D+Q	0.23 *8*
6584.3	3/2	3566	27.9	3017.4	3/2$^-$		
		3652	21.8	2932.1	3/2$^-$		
		4111	11.0	2473.0	3/2$^-$		
		4226	8.9	2358.1	3/2$^-$		
		4651	6.1	1933.0	3/2$^-$		
		4924	17.1	1661.09	3/2$^-$		
		6584	7.3	0	3/2$^-$		
6585.2	3/2,(5/2)	4227		2358.1	3/2$^-$	D+Q	0.36 *9*
6604.3	3/2	4246		2358.1	3/2$^-$	D+Q	0.12 *7*
		4401		2203.2	5/2$^-$	D+Q	0.22 *13*
		5210		1393.94	5/2$^-$	D+Q	0.14 *8*

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^{60}Ni(p,γ):resonances (continued)

γ(^{61}Cu) (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]	δ[g]	Comments
6604.3	3/2	6604		0	3/2$^-$	D+Q	0.19 *5*	
6619.3	3/2	3355[j]	1 *1*	3262.7	11/2$^-$			γ to 11/2$^-$ from 3/2 resonance, requiring E4 or M4 is unlikely.
		3554	2 *1*	3065.1	3/2$^-$			
		3935	1 *1*	2684.0	3/2$^-$			
		4219	2 *1*	2399.7	7/2$^-$			
		4261	2 *1*	2358.1	3/2$^-$			
		4416	2 *1*	2203.2	5/2$^-$			
		4887	3 *1*	1733.1	7/2$^-$			
		5225	15 *1*	1393.94	5/2$^-$			
		5309	1 *1*	1310.88	7/2$^-$			
		5649	5 *1*	970.00	5/2$^-$			
		6619	66 *2*	0	3/2$^-$	D+Q	0.78 *12*	
6627.2	(1/2)	2331[j]	1	4296.1?				γ to (11/2$^-$) from (1/2) resonance, requiring E5 or M5 is unlikely.
		2680[j]	7	3947.0?				
		2837	9	3790.2				
		2897	2	3730.1				
		3037[j]	7	3590.1?				
		3350	2	3277.1				
		3535	6	3092.1	3/2$^-$			
		3562	8	3065.1	3/2$^-$			
		3609	2	3017.4	3/2$^-$			
		3786	2	2841.2	1/2$^-$,3/2$^-$			
		4269	3	2358.1	3/2$^-$			
		4694	2	1933.0	3/2$^-$			
		4966	3	1661.09	3/2$^-$			
		6151	35	475.84	1/2$^-$			
		6627	11	0	3/2$^-$			
6645.3	(1/2)	3368	18 *5*	3277.1				
		3580	6 *5*	3065.1	3/2$^-$			
		3713[j]		2932.1	3/2$^-$			
		3789	8 *5*	2856.2	1/2$^-$,3/2$^-$			
		3804	9 *5*	2841.2	1/2$^-$,3/2$^-$			
		4172	15 *5*	2473.0	3/2$^-$			
		4557	10 *5*	2088.2	1/2$^-$			
		6169[j]		475.84	1/2$^-$			
		6645	34 *5*	0	3/2$^-$			
6678.4	1/2	3248	2 *1*	3430.3				
		3586	8 *1*	3092.1	3/2$^-$			
		3613	3 *1*	3065.1	3/2$^-$			
		3746	10 *1*	2932.1	3/2$^-$			
		3822	4 *1*	2856.2	1/2$^-$,3/2$^-$			
		3837	1 *1*	2841.2	1/2$^-$,3/2$^-$			
		4205	11 *1*	2473.0	3/2$^-$			
		4320	7 *1*	2358.1	3/2$^-$			
		4745	9 *1*	1933.0	3/2$^-$			
		4774	5 *1*	1904.4	5/2$^-$			
		5018	2 *1*	1661.09	3/2$^-$			
		5708	1 *1*	970.00	5/2$^-$			
		6202	9 *1*	475.84	1/2$^-$			
		6678	28 *2*	0	3/2$^-$			
6711.9	3/2$^-$	4808[e]		1904.4	5/2$^-$	D+Q	+0.44[h] *36*	
		5049[e]		1661.09	3/2$^-$	D+Q	+1.29[h] *+0−79*	

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^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]	δ[g]
6711.9	3/2$^-$	5317[e]		1393.94	5/2$^-$	D+Q	+0.8[h] *+0–5*
		6237[e]		475.84	1/2$^-$	D(+Q)	−0.19[h] *44*
		6712[e]		0	3/2$^-$	D+Q	+1.25[h] *+18–13*
6739.0	3/2$^-$,5/2$^-$	4266[e]		2473.0	3/2$^-$	D+Q	+34[h] *16*
		5344[e]		1393.94	5/2$^-$	D+Q	+0.8[h] *+0–3*
		5769[e]		970.00	5/2$^-$	D+Q	+0.25[h] *+19–13*
		6739[e]		0	3/2$^-$	D+Q	+0.83[h] *+46–18*
6802.3	1/2$^-$,3/2	3012	14.5	3790.2			
		3444	7.8	3358.2			
		3784	7.7	3017.4	3/2$^-$		
		4714	7.4	2088.2	1/2$^-$		
		4869	4.6	1933.0	3/2$^-$		
		5142	17.3	1661.09	3/2$^-$		
		6326	3.6	475.84	1/2$^-$		
		6802	37.0	0	3/2$^-$		
6915.0	(3/2$^-$)	4982[e]		1933.0	3/2$^-$	D+Q	+0.55[h] *+74–23*
		6439[e]		475.84	1/2$^-$	D+Q	−0.07[h] *10*
		6914[e]		0	3/2$^-$	D+Q	+0.70[h] *+25–15*
6937.4	3/2$^-$	4849[e]		2088.2	1/2$^-$	D(+Q)	+0.00[h] *12*
		5033[e]		1904.4	5/2$^-$	D(+Q)	−0.01[h] *14*
		5967[e]		970.00	5/2$^-$	D+Q	+0.14[h] *13*
		6937[e]		0	3/2$^-$	D+Q	+0.37[h] *9*
7010.7	3/2$^-$	3398[j]	2	3612.6?			
		3599	1	3411.7			
		3734	2	3277.1			
		3946	5	3065.1	3/2$^-$		
		4079	10	2932.1	3/2$^-$	D+Q	−0.05 *+13–18*
		4155	5	2856.2	1/2$^-$,3/2$^-$		
		4219	3	2791.9	5/2$^-$		
		4327	4	2684.0	3/2$^-$	D+Q	−0.12 *22*
		4538	1	2473.0	3/2$^-$		
		4653	3	2358.1	3/2$^-$		
		4808	5	2203.2	5/2$^-$		
		4923	5	2088.2	1/2$^-$	D+Q	+0.21 *9*
		5067	2	1943.2	7/2$^-$		
		5078	4	1933.0	3/2$^-$		
		5342[e]		1661.09	3/2$^-$	D+Q	+0.49[h] *+17–14*
		5617	22	1393.94	5/2$^-$	D+Q	−0.21 *+18–42*
		6041	3	970.00	5/2$^-$		
		6535	7	475.84	1/2$^-$	D+Q	+0.04 *9*
		7011	15	0	3/2$^-$	D+Q	+0.02 *14*
7016.3	3/2$^-$	5621[e]		1393.94	5/2$^-$	D(+Q)	−0.08[h] *11*
		6541[e]		475.84	1/2$^-$	D(+Q)	+0.03[h] *9*
		7016[e]		0	3/2$^-$	D+Q	+0.18[h] *7*
7025.4	5/2	4007	3	3017.4	3/2$^-$		
		4023	3	3002.4	5/2		
		4169	2	2856.2	1/2$^-$,3/2$^-$		
		4233	4	2791.9	5/2$^-$		
		4552	4	2473.0	3/2$^-$		
		4667	4	2358.1	3/2$^-$		
		5092	9	1933.0	3/2$^-$	D+Q	+0.30 *16*

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^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]	δ[g]
7025.4	5/2	5121	3	1904.4	5/2$^-$		
		5293	9	1733.1	7/2$^-$	D(+Q)	−0.02 *11*
		5364	17	1661.09	3/2$^-$	D+Q	+0.36 *12*
		5631	2	1393.94	5/2$^-$		
		5715	4	1310.88	7/2$^-$		
		6055	10	970.00	5/2$^-$		
		7025	26	0	3/2$^-$	D+Q	+0.07 *9*
7044.7	(1/2),3/2$^-$	4957[e]		2088.2	1/2$^-$	D+Q	−0.11[h] *10*
		5382[e]		1661.09	3/2$^-$	D+Q	+0.50[h] *+14−10*
		7045[e]		0	3/2$^-$	D+Q	+0.44[h] *9*
7059.8	3/2$^-$	5398[e]		1661.09	3/2$^-$	D+Q	+0.50[h] *+16−13*
		5666[e]		1393.94	5/2$^-$	D+Q	−0.25[h] *15*
		6091[e]		970.00	5/2$^-$	D+Q	+0.14[h] *10*
		7058[e]		0	3/2$^-$	D+Q	+0.55[h] *12*
7107.3	1/2	3317	4.6	3790.2			
		3749	4.1	3358.2			
		3830	3.8	3277.1			
		4175	10.9	2932.1	3/2$^-$		
		4749	11.8	2358.1	3/2$^-$		
		5019	1.7	2088.2	1/2$^-$		
		5174	4.4	1933.0	3/2$^-$		
		5446	13.8	1661.09	3/2$^-$		
		6631	38.9	475.84	1/2$^-$		
		7107	6.0	0	3/2$^-$		
7120.8	3/2$^-$	6645[e]		475.84	1/2$^-$	D+Q	−0.17[h] *8*
		7120[e]		0	3/2$^-$	D+Q	−0.42[h] *10*
7201.3	(3/2$^-$)	5539[e]		1661.09	3/2$^-$	D+Q	+0.75[h] *+54−19*
		5887[e]		1310.88	7/2$^-$	Q+O	−0.28[h] *+14−17*
		6232[e]		970.00	5/2$^-$	D+Q	−0.07[h] *11*
		6727[e]		475.84	1/2$^-$	D+Q	+0.08[h] *+11−8*
		7202[e]		0	3/2$^-$	D+Q	+0.65[h] *+21−13*
7214.3	3/2$^-$	5819[e]		1393.94	5/2$^-$	D+Q	−0.50[h] *+15−21*
		6244[e]		970.00	5/2$^-$	D(+Q)	−0.04[h] *12*
		6739[e]		475.84	1/2$^-$	D+Q	+0.14[h] *10*
		7214[e]		0	3/2$^-$	D+Q	+0.24[h] *6*
7223.2	1/2	4158	9.3	3065.1	3/2$^-$		
		4205	10.4	3017.4	3/2$^-$		
		4291	7.6	2932.1	3/2$^-$		
		4750	3.6	2473.0	3/2$^-$		
		4865	6.2	2358.1	3/2$^-$		
		5290	10.9	1933.0	3/2$^-$		
		5562	3.3	1661.09	3/2$^-$		
		6747	18.6	475.84	1/2$^-$		
		7223	30.1	0	3/2$^-$		
7262.3	1/2,3/2	3904	2.3	3358.2			
		3985	1.9	3277.1			
		4244	1.2	3017.4	3/2$^-$		
		4578	6.5	2684.0	3/2$^-$		
		4789	2.0	2473.0	3/2$^-$		
		4904	2.2	2358.1	3/2$^-$		
		5174	0.6	2088.2	1/2$^-$		

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^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π
7262.3	1/2,3/2	5329	3.0	1933.0	$3/2^-$
		5602	7.4	1661.09	$3/2^-$
		6786	1.8	475.84	$1/2^-$
		7262	71.1	0	$3/2^-$
7283.2	1/2,3/2	3846[j]	6.1	3437.1?	
		4006	3.6	3277.1	
		4218	1.5	3065.1	$3/2^-$
		4265	0.5	3017.4	$3/2^-$
		4442	1.5	2841.2	$1/2^-$,$3/2^-$
		4599	2.1	2684.0	$3/2^-$
		4810	2.6	2473.0	$3/2^-$
		5195	0.5	2088.2	$1/2^-$
		5350	1.9	1933.0	$3/2^-$
		5622	8.0	1661.09	$3/2^-$
		6807	4.3	475.84	$1/2^-$
		7283	67.4	0	$3/2^-$
7847.1		6452	8	1393.94	$5/2^-$
		6537[†]	14[‡]	1310.88	$7/2^-$
		6877[†]	14[‡]	970.00	$5/2^-$
		7370[†]	12[‡]	475.84	$1/2^-$
8131.9		6744[†]	4[‡]	1393.94	$5/2^-$
		6819[†]	18[‡]	1310.88	$7/2^-$
		7159[†]	11[‡]	970.00	$5/2^-$
		7653[†]	12[‡]	475.84	$1/2^-$
8149.4?		6754[†]	20[‡]	1393.94	$5/2^-$
		6839[†]	30[‡]	1310.88	$7/2^-$
		7179[†]	15[‡]	970.00	$5/2^-$
		7673[†]	13[‡]	475.84	$1/2^-$
8194.4		6798[†]	15[‡]	1393.94	$5/2^-$
		6887[†]	15[‡]	1310.88	$7/2^-$
		7223[†]	19[‡]	970.00	$5/2^-$
		7717[†]	12[‡]	475.84	$1/2^-$
8431.4	5/2	7120.3	35 *3*	1310.88	$7/2^-$
		8430.6	65 *3*	0	$3/2^-$
8436.4	1/2	7960.0	86 *4*	475.84	$1/2^-$
		8435.8	14 *4*	0	$3/2^-$
8440.0	1/2	6778.8	25 *6*	1661.09	$3/2^-$
		7045.5	12 *6*	1393.94	$5/2^-$
		7963.5	36 *10*	475.84	$1/2^-$
		8439.3	27 *5*	0	$3/2^-$
8442.8	3/2,5/2	7472.3	82 *4*	970.00	$5/2^-$
		8442.1	18 *4*	0	$3/2^-$
8446.0		5724.9	58 *4*	2721.2	$9/2^+$
		7134.8	22 *5*	1310.88	$7/2^-$
		7969.3	10 *3*	475.84	$1/2^-$
		8445.1	10 *3*	0	$3/2^-$
8447.1	$9/2^+$	4114[&]	7[&]	4333.0	
8447.1	$9/2^+$	7135[&]	23[&]	1310.88	$7/2^-$
8448.2	$9/2^+$	3199[&]	7[&]	5251.7	
		4319[&]	13[&]	4132.8	$9/2^+$
		4470[&]	1[&]	3980.6	
		5434[&]	9[&]	3016.6	$11/2^-$
		5729[&]	53[&]	2721.2	$9/2^+$
		5823[&]	2[&]	2627.2	$11/2^-$
		6051[&]	6[&]	2399.7	$7/2^-$
		6155[&]	5[&]	2295.6	$9/2^-$
8454.5	$9/2^+$	3202[&]	4[&]	5251.7	
		3332[&]	7[&]	5126.3	
		4321[&]	8[&]	4132.8	$9/2^+$
		4473[&]	3[&]	3980.6	
		5437[&]	8[&]	3016.6	$11/2^-$
		5732[&]	29[&]	2721.2	$9/2^+$
		5841[&]	3[&]	2613.1	$9/2^-$
		6054[&]	12[&]	2399.7	$7/2^-$
		6117[&]	6[&]	2336.9	$9/2^-$
		6158[&]	4[&]	2295.6	$9/2^-$
		6511[&]	5[&]	1943.2	$7/2^-$
		6720[&]	12[&]	1733.1	$7/2^-$
8458.6	$9/2^+$	3206[&]	1[&]	5251.7	
		3336[&]	3[&]	5126.3	
		4325[&]	2[&]	4132.8	$9/2^+$
		5197[&]	4[&]	3262.7	$11/2^-$
		5736	30[&]	2721.2	$9/2^+$
		6058[&]	7[&]	2399.7	$7/2^-$
		6121[&]	14[&]	2336.9	$9/2^-$
		6162[&]	2[&]	2295.6	$9/2^-$
		6515[&]	4[&]	1943.2	$7/2^-$
		6724[&]	22[&]	1733.1	$7/2^-$
		7146[&]	11[&]	1310.88	$7/2^-$
8464.4	$9/2^+$	3212[&]	2[&]	5251.7	
		3342[&]	1[&]	5126.3	
		4082[&]	1[&]	4382.0?	
		4131[&]	2[&]	4333.0	
		4331[&]	10[&]	4132.8	$9/2^+$
		4483[&]	2[&]	3980.6	
		5447[&]	8[&]	3016.6	$11/2^-$
		5742[&]	64[&]	2721.2	$9/2^+$
		6064[&]	2[&]	2399.7	$7/2^-$
		6168[&]	1[&]	2295.6	$9/2^-$
		6521[&]	1[&]	1943.2	$7/2^-$
		6730[&]	1[&]	1733.1	$7/2^-$
		7152[&]	1[&]	1310.88	$7/2^-$
8465.9	$9/2^+$	3214[&]	2[&]	5251.7	
		4133[&]	3[&]	4333.0	

^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π
		4314[&]	1[&]	4132.8	$9/2^+$			4333[&]	9[&]	4132.8	$9/2^+$
		5725[&]	43[&]	2721.2	$9/2^+$			4485[&]	1[&]	3980.6	
		6047[&]	17[&]	2399.7	$7/2^-$			5449[&]	8[&]	3016.6	$11/2^-$
		6504[&]	9[&]	1943.2	$7/2^-$			5744[&]	64[&]	2721.2	$9/2^+$

Continued on next page (footnotes at end of table)

^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	Mult.[f]
8465.9	9/2$^+$	6129[&]	10[&]	2336.9	9/2$^-$	
		6732[&]	1[&]	1733.1	7/2$^-$	
		7154[&]	2[&]	1310.88	7/2$^-$	
8469.5	5/2	6564.5[j]	23 *4*	1904.4	5/2$^-$	
		7158.5	43 *5*	1310.88	7/2$^-$	
		8468.8	34 *5*	0	3/2$^-$	
8473.1	9/2$^+$	3221[&]	3[&]	5251.7		
		4140[&]	1[&]	4333.0		
		4340[&]	11[&]	4132.8	9/2$^+$	
		5456[&]	2[&]	3016.6	11/2$^-$	
		5470[&]	2[&]	3002.4	5/2	
		5751[&]	62[&]	2721.2	9/2$^+$	
		6073[&]	4[&]	2399.7	7/2$^-$	
		6136[&]	5[&]	2336.9	9/2$^-$	
		6177[&]	3[&]	2295.6	9/2$^-$	
		6530[&]	3[&&]	1943.2	7/2$^-$	
		7161[&]	4[&]	1310.88	7/2$^-$	
8476.3	9/2$^+$	3224[&]	3[&]	5251.7		
		3354[&]	5[&]	5126.3		
		4343[&]	8[&]	4132.8	9/2$^+$	
		5473[&]	2[&]	3002.4	5/2	
		5754[&]	50[&]	2721.2	9/2$^+$	
		5863[&]	3[&]	2613.1	9/2$^-$	
		6076[&]	6[&]	2399.7	7/2$^-$	
		6139[&]	6[&]	2336.9	9/2$^-$	
		6180[&]	3[&]	2295.6	9/2$^-$	
		6533[&]	3[&]	1943.2	7/2$^-$	
		7164[&]	11[&]	1310.88	7/2$^-$	
8478.3	9/2$^+$	3226[&]	1[&]	5251.7		
		3356[&]	1[&]	5126.3		
		4345[&]	4[&]	4132.8	9/2$^+$	
		4497[&]	2[&]	3980.6		
		5461[&]	2[&]	3017.4	3/2$^-$	[E3]
		5756[&]	67[&]	2721.2	9/2$^+$	
		5850[&]	6[&]	2627.2	11/2$^-$	
		5865[&]	3[&]	2613.1	9/2$^-$	
		6078[&]	3[&]	2399.7	7/2$^-$	
		6141[&]	2[&]	2336.9	9/2$^-$	
		6182[&]	2[&]	2295.6	9/2$^-$	
		6535[&]	2[&]	1943.2	7/2$^-$	
		6744[&]	2[&]	1733.1	7/2$^-$	
		7166[&]	3[&]	1310.88	7/2$^-$	
8481.5	9/2$^+$	3016[&]	2[&]	5465		
		3359[&]	2[&]	5126.3		
		4148[&]	1[&]	4333.0		

Continued on next page (footnotes at end of table)

^{60}Ni(p,γ):resonances (continued)

$\gamma(^{61}Cu)$ (continued)

E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π	E_i(level)	J_i^π	E_γ[#]	I_γ[@]	E_f	J_f^π
8481.5	9/2$^+$	4348[&]	4[&]	4132.8	9/2$^+$	8492.4	3/2	7181.4	18 *4*	1310.88	7/2$^-$
		4500[&]	2[&]	3980.6				7521.9	22 *4*	970.00	5/2$^-$
		5759[&]	78[&]	2721.2	9/2$^+$			8015.9	27 *4*	475.84	1/2$^-$
		5853[&]	8[&]	2627.2	11/2$^-$			8491.7	33 *4*	0	3/2$^-$
		7169[&]	4[&]	1310.88	7/2$^-$	8499.9	5/2	6766.2	36 *4*	1733.1	7/2$^-$
8485.0	9/2$^+$	3233[&]	1[&]	5251.7				7188.3	25 *4*	1310.88	7/2$^-$
		4103[&]	2[&]	4382.0?				8499.6	39 *4*	0	3/2$^-$
		4352[&]	8[&]	4132.8	9/2$^+$	8503.7		8503.1	100	0	3/2$^-$
		4504[&]	1[&]	3980.6		8507.3	1/2	8506.7	100	0	3/2$^-$
		5468[&]	3[&]	3016.6	11/2$^-$	8508.1	1/2	6603.1[j]	20 *7*	1904.4	5/2$^-$
		5482[&]	4[&]	3002.4	5/2			6846.9	25 *6*	1661.09	3/2$^-$
		5763[&]	55[&]	2721.2	9/2$^+$			8031.6	12 *5*	475.84	1/2$^-$
		5857[&]	2[&]	2627.2	11/2$^-$			8507.4	43 *6*	0	3/2$^-$
		6148[&]	2[&]	2336.9	9/2$^-$	8509.9		6306[j]	9 *2*	2203.2	5/2$^-$
		6189[&]	1[&]	2295.6	9/2$^-$			6576	10 *2*	1933.0	3/2$^-$
		6542[&]	7[&]	1943.2	7/2$^-$			6848.8	5 *2*	1661.09	3/2$^-$
		6751[&]	9[&]	1733.1	7/2$^-$			7199.0	5 *3*	1310.88	7/2$^-$
		7173[&]	5[&]	1310.88	7/2$^-$			8509.3	71 *4*	0	3/2$^-$
8489.9	1/2	6828.7	33 *4*	1661.09	3/2$^-$	8515.4		8039.0	100	475.84	1/2$^-$
		8013.4	15 *5*	475.84	1/2$^-$	8522.6	1/2,3/2	8046.2	35 *5*	475.84	1/2$^-$
		8489.2	52 *5*	0	3/2$^-$			8522.0	65 *5*	0	3/2$^-$

[†] From level energy difference (1983Si06).
[‡] From 1983Si06.
[#] From level energy difference.
[@] Relative branching from each level. Decay of resonances from 1973Tr06, 1974Tr03, 1974Kr26, 1975Kr05, 1976Be30, 1979Bo09.
[&] From 1990Sz01.
[a] From 1974Kr26.
[b] From 1974Ad06.
[c] From 1976Be30.
[d] From 1974Tr03.
[e] From level energy difference (1988Iz01).
[f] From $\gamma(\theta)$ measurements, see δ.
[g] Dipole-quadrupole mixing, 1974Tr03, 1976Kr19, 1981By03, 1988Iz01. When there are two solutions, only the smaller δ has been given.
[h] From 1988Iz01.
[i] From p$\gamma\gamma(\theta)$ data of 1965Go02.
[j] Placement of transition in the level scheme is uncertain.

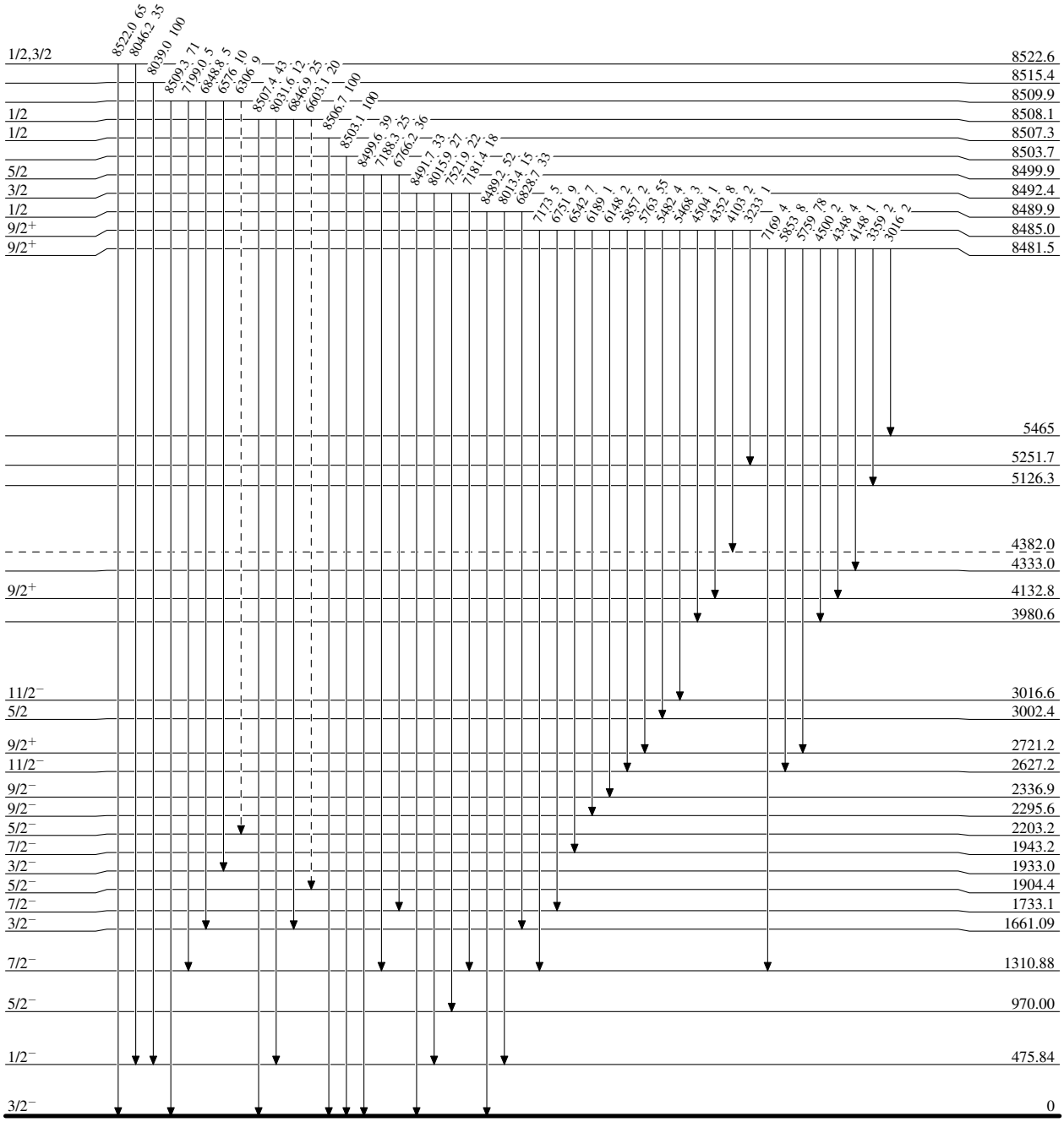
^{60}Ni(p,γ):resonances

Legend

Level Scheme

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{61}_{29}Cu_{32}$

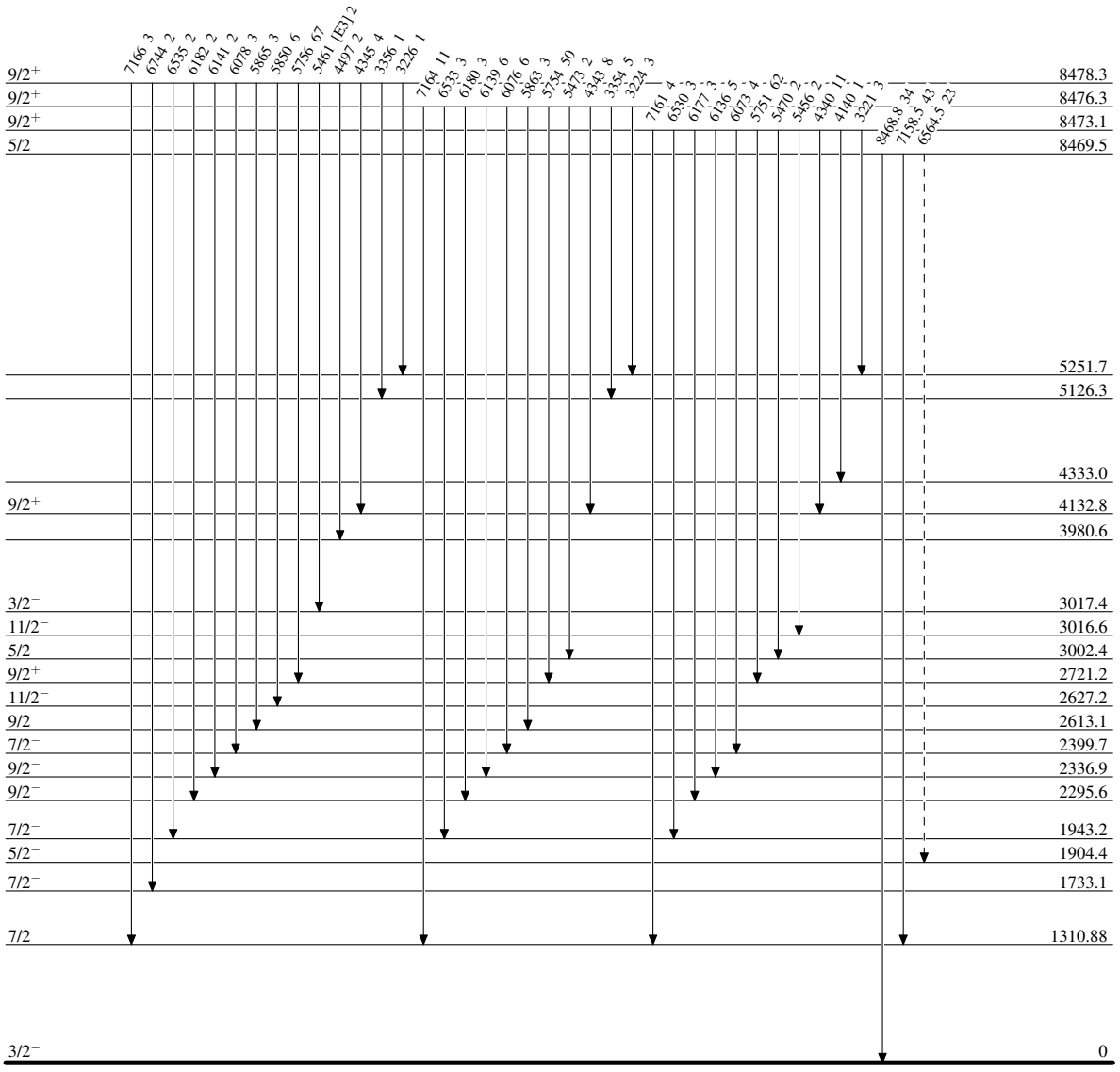
^{60}Ni(p,γ):resonances

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)

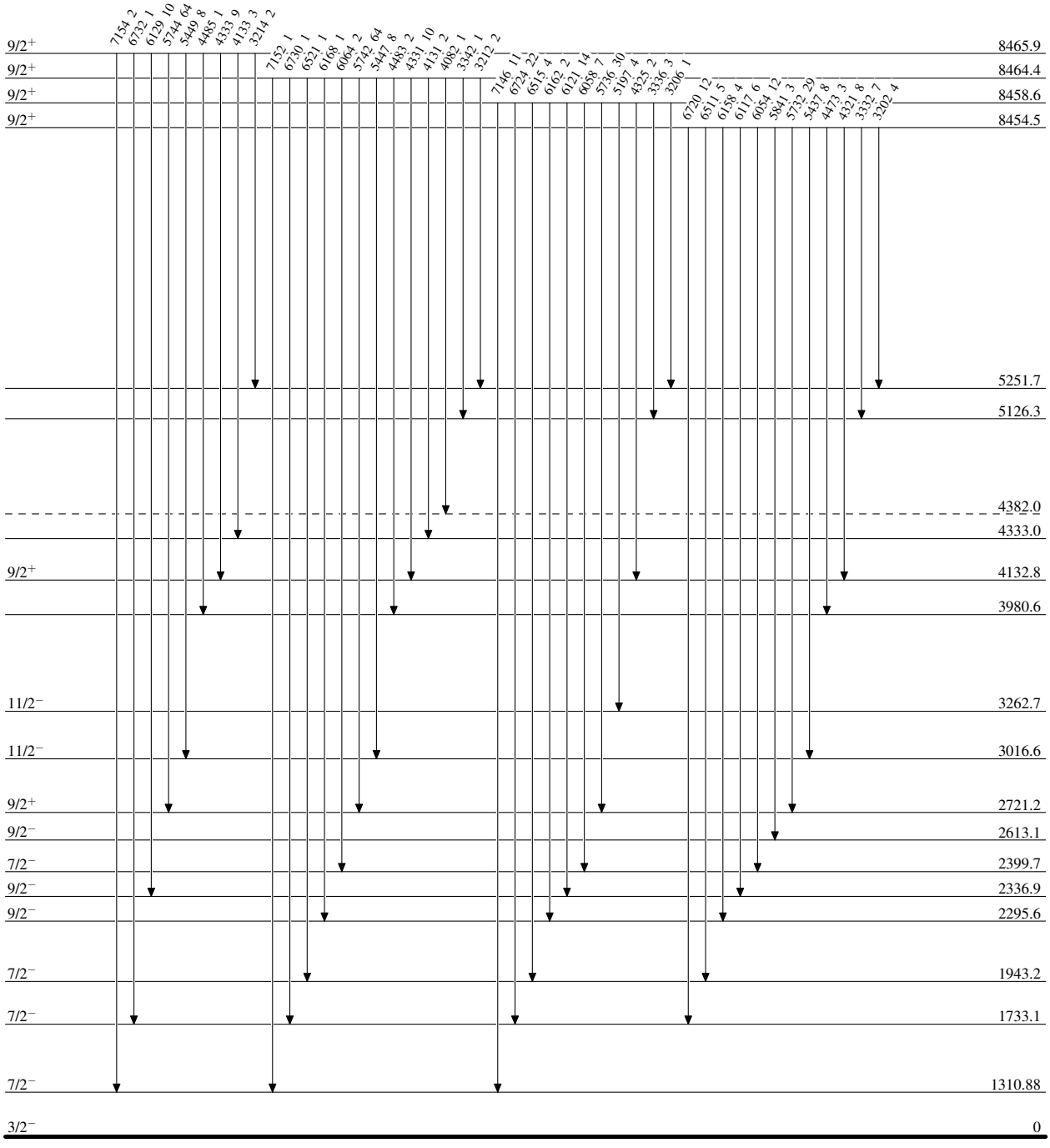


$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances

Level Scheme (continued)

Intensities: % photon branching from each level

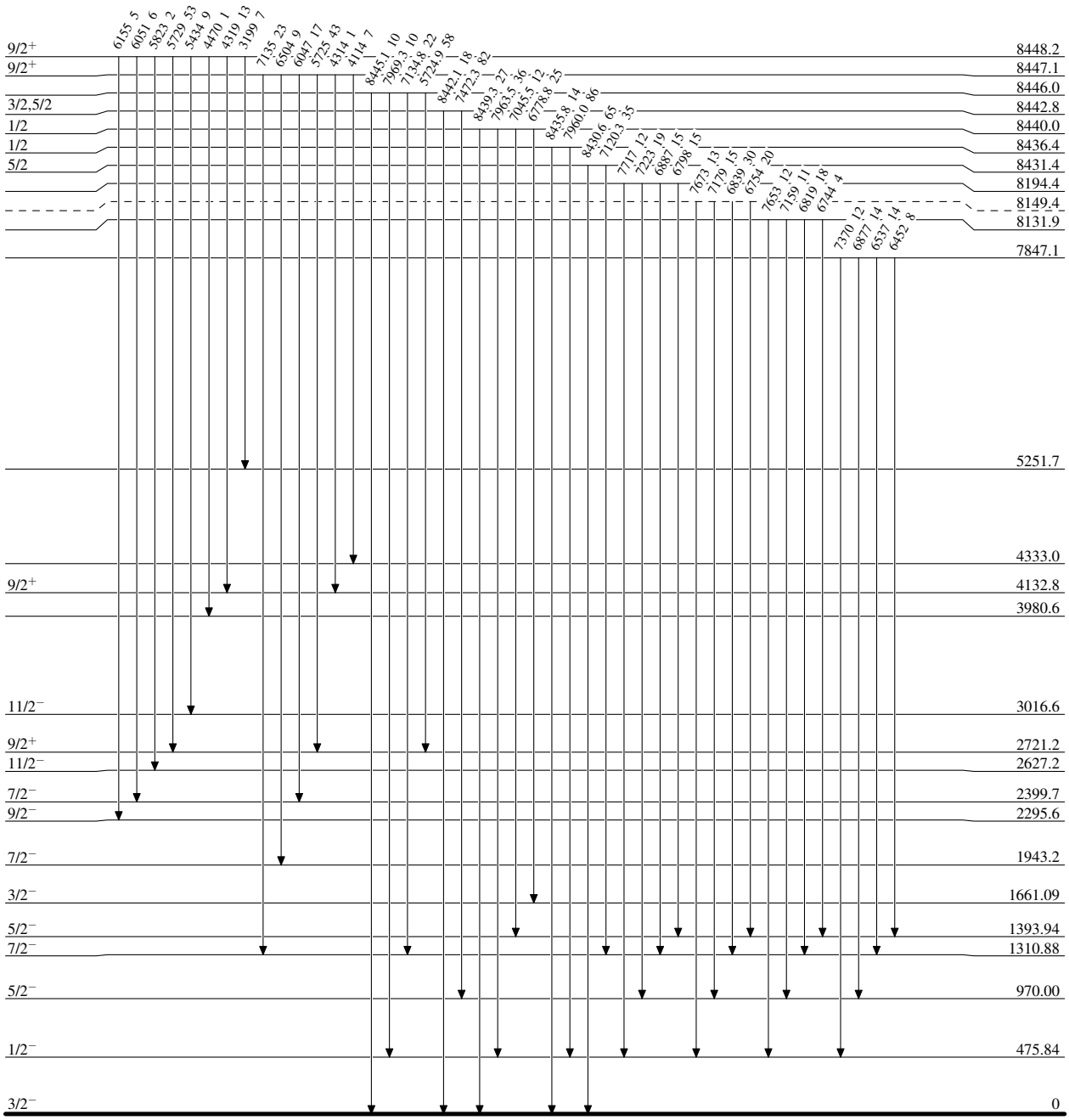


$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances

Level Scheme (continued)

Intensities: % photon branching from each level



$^{61}_{29}Cu_{32}$

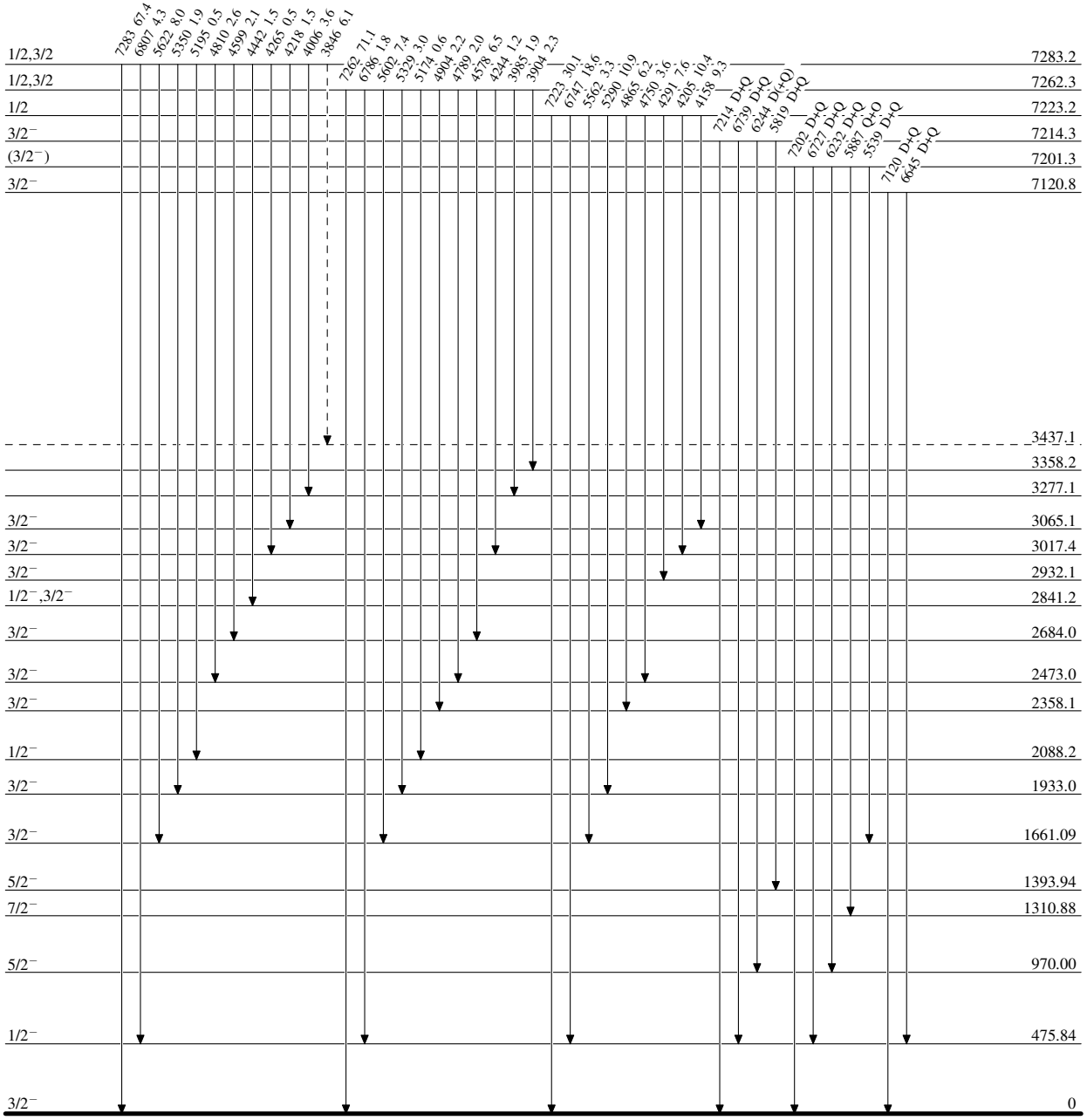
^{60}Ni(p,γ):resonances

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)

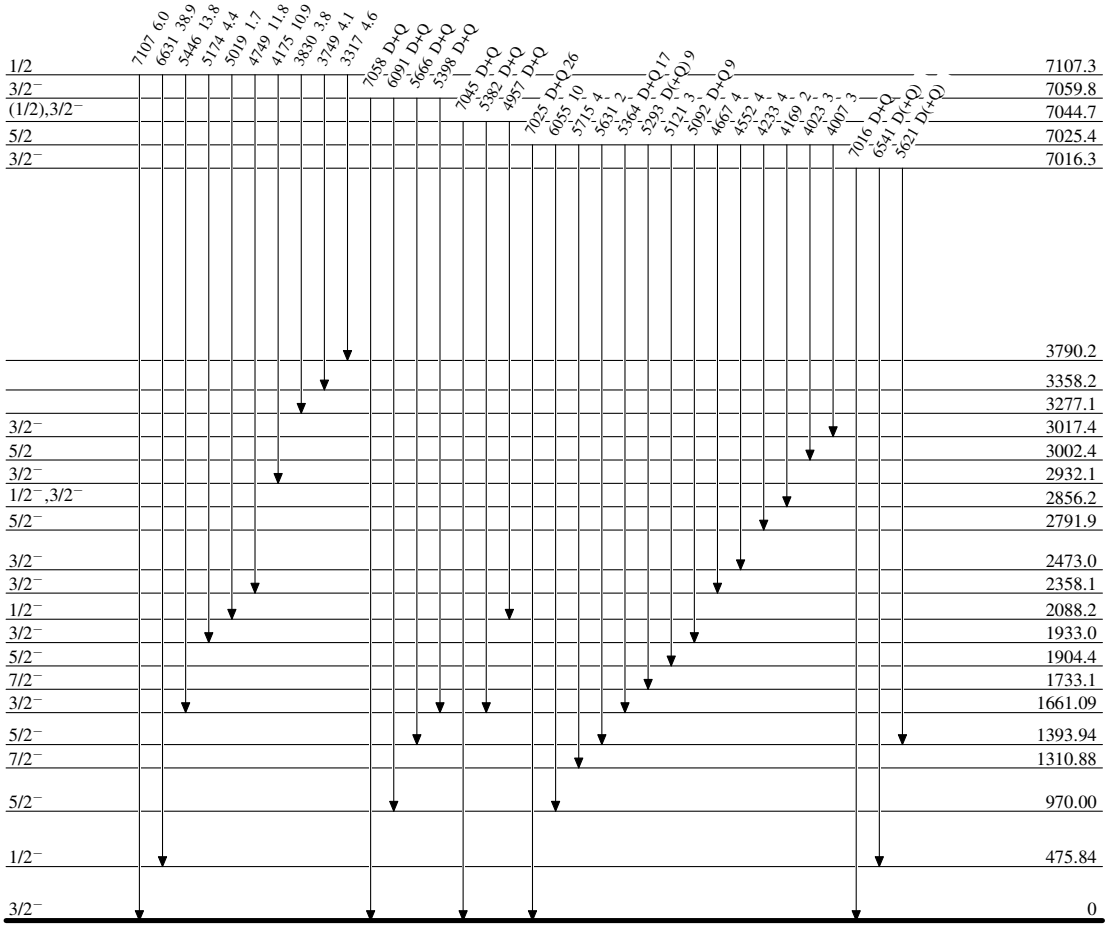


$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances

Level Scheme (continued)

Intensities: % photon branching from each level



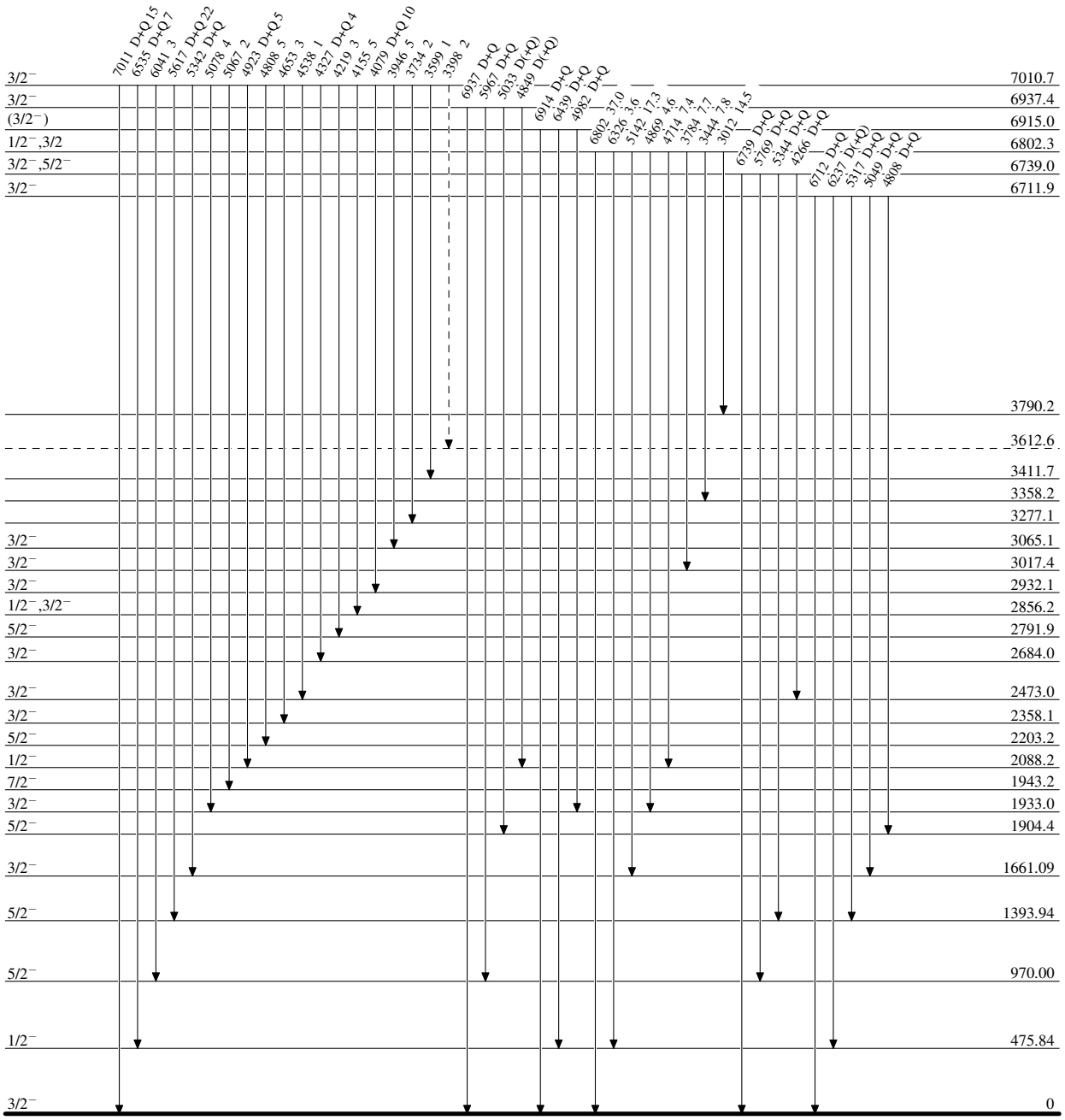
$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances Legend

Level Scheme (continued)

Intensities: % photon branching from each level

- - - - - - ► γ Decay (Uncertain)



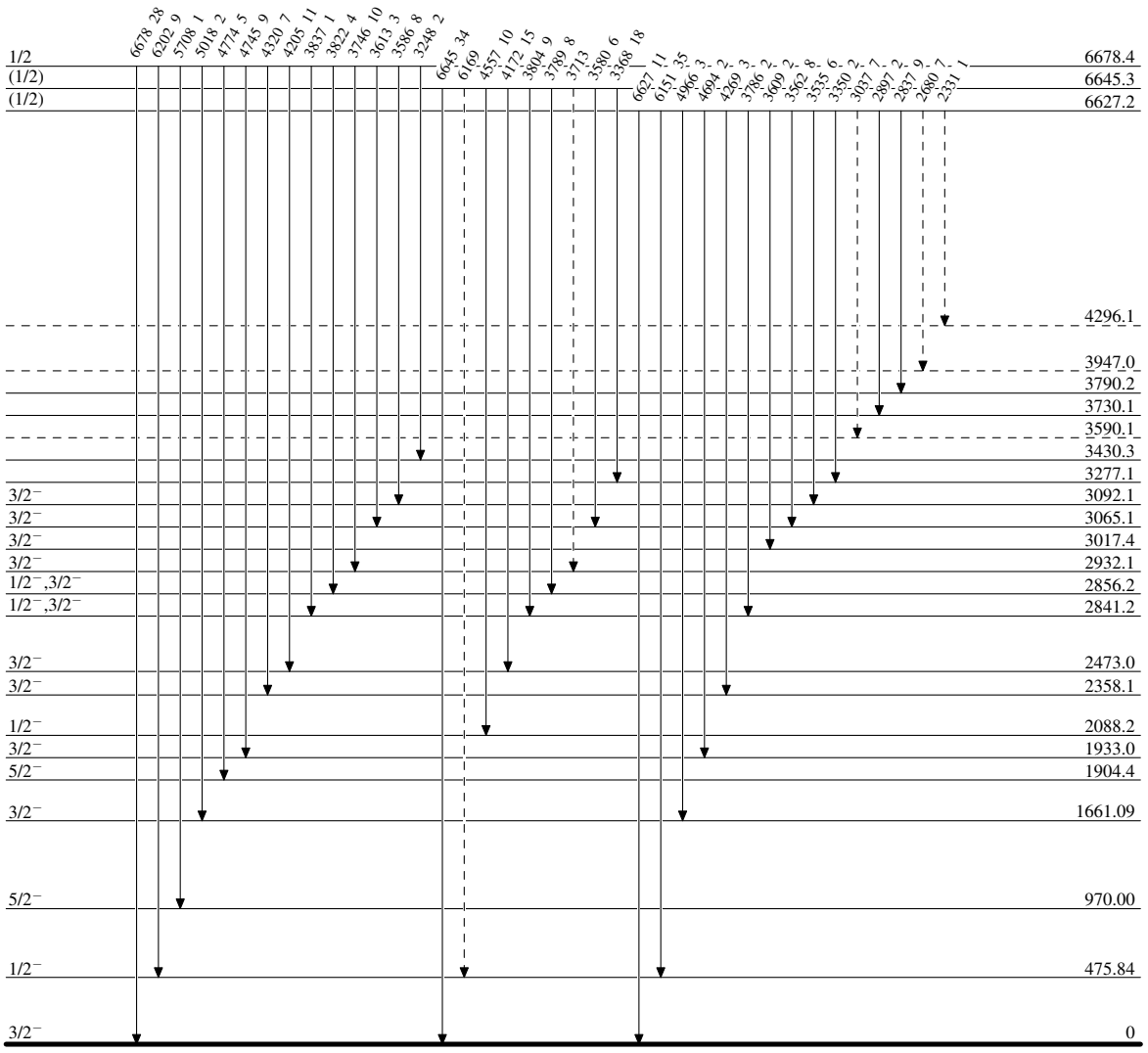
$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



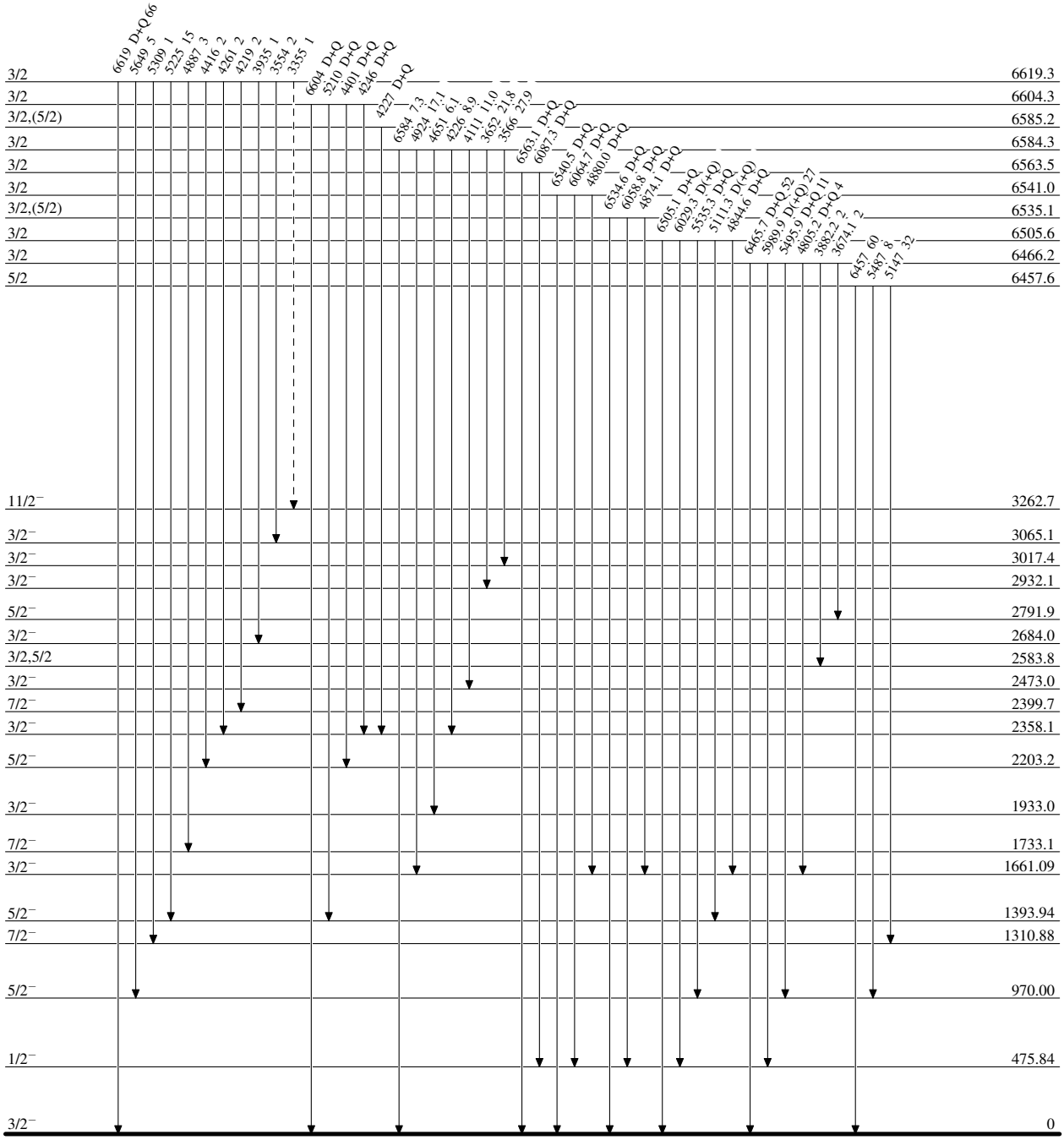
$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances Legend

Level Scheme (continued)

Intensities: % photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{61}_{29}Cu_{32}$

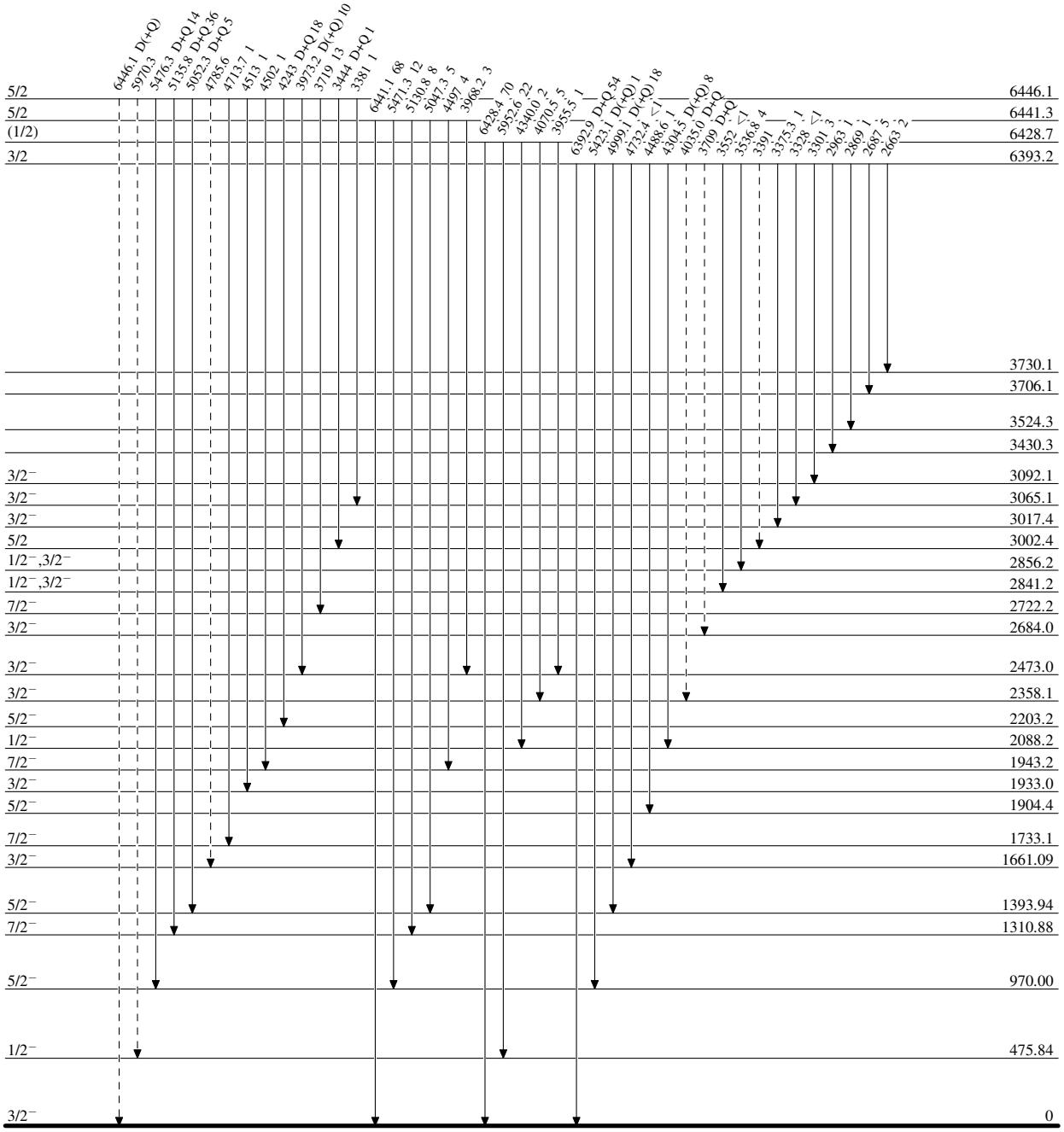
^{60}Ni(p,γ):resonances

Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



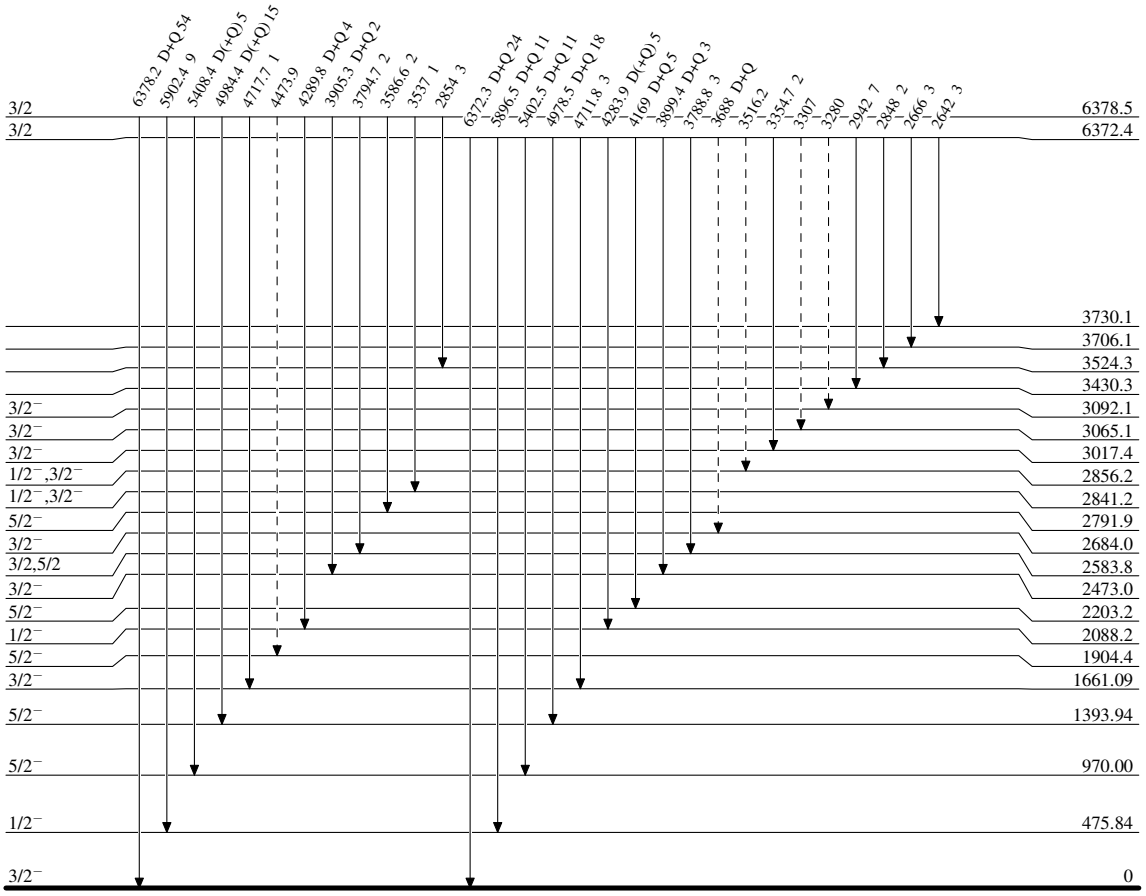
$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



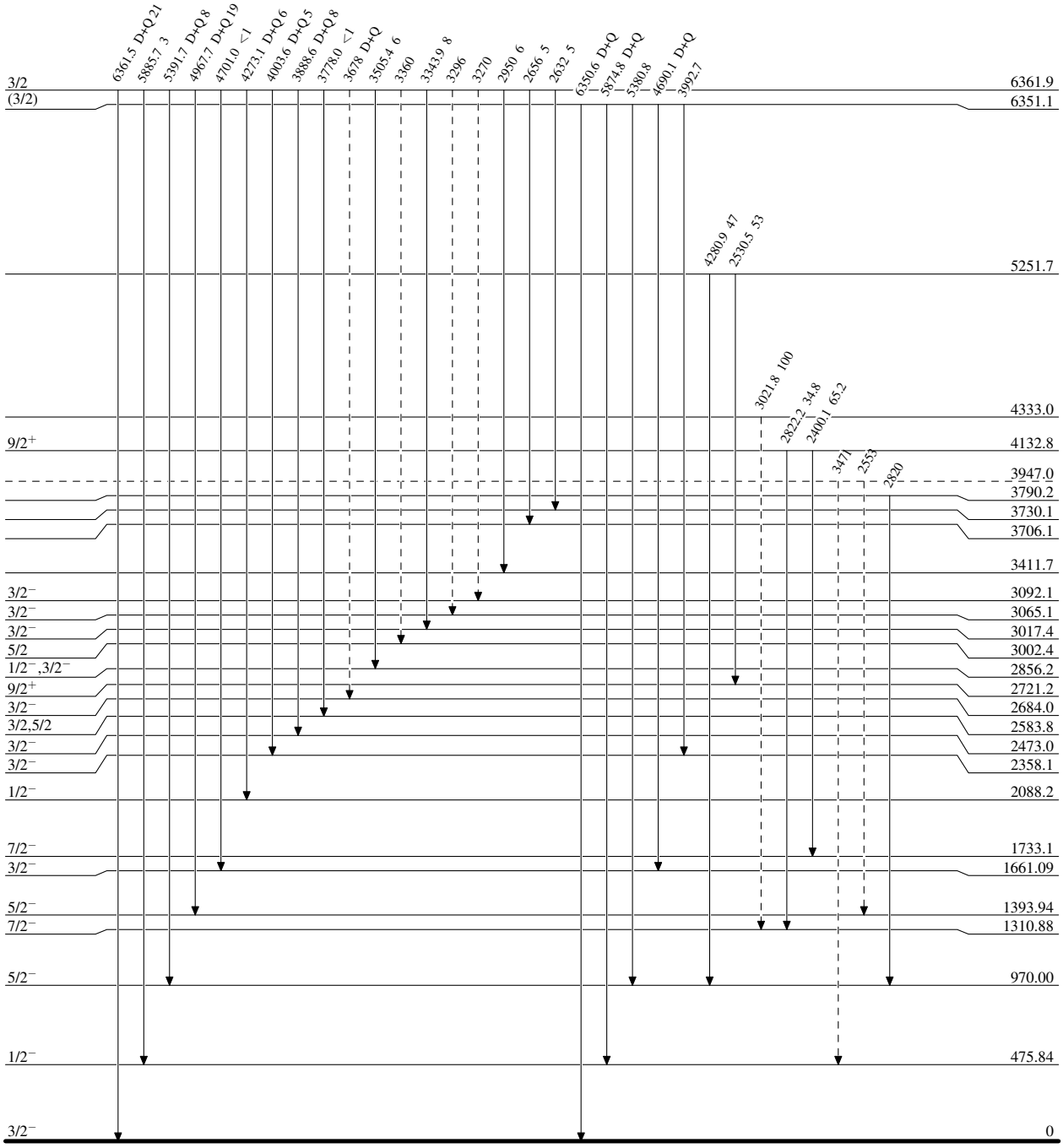
$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)



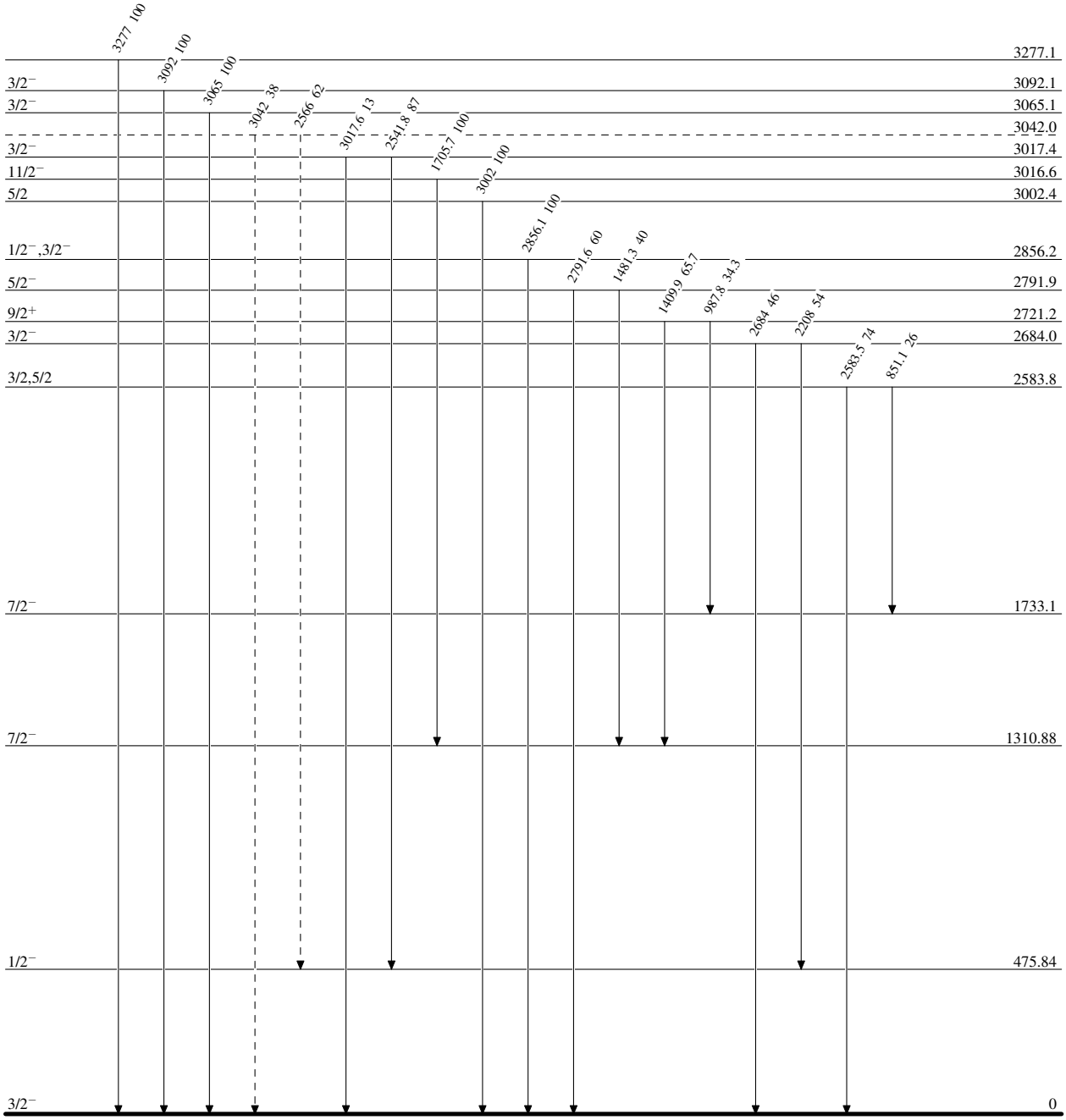
$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances Legend

Level Scheme (continued)

Intensities: % photon branching from each level

γ Decay (Uncertain)

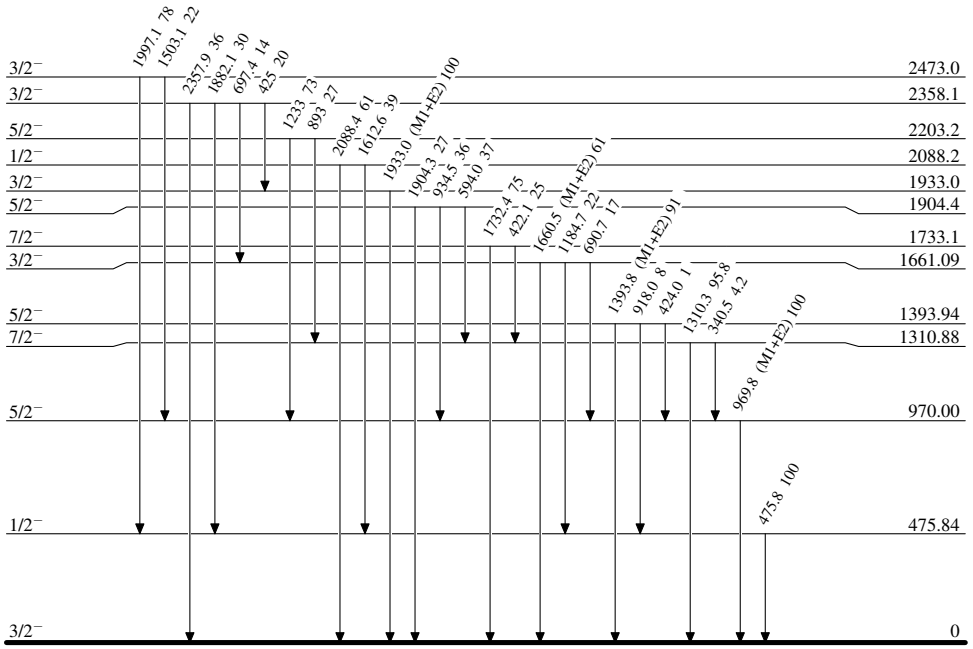


$^{61}_{29}Cu_{32}$

^{60}Ni(p,γ):resonances

Level Scheme (continued)

Intensities: % photon branching from each level



$^{61}_{29}Cu_{32}$