^{58}Ni(^{3}He,dγ) 1974Ne08,1978Sc07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 151, 1 (2018)	1-Apr-2018

1974Ne08: E=11.6 MeV; dγ coin with ΔE-E telescope (at ±55°) and Ge(Li) (at 90°), 99.8% ^{58}Ni target, particle identification; measured Eγ, Iγ, DSAM lifetimes of low-energy levels.

1978Sc07: E=18 MeV; FWHM=50 keV, 99.9% ^{58}Ni target, Ge(Li) (at 90° and 147°) and semi (at 0°) detectors; measured branching, dγ correlations (Method II of Litherland-Ferguson).

^{59}Cu Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0	3/2−[&]		
491.0 *1*	1/2−[&]	0.58 ps *21*	
913.8 *1*	5/2−[&]	>1.1 ps	
1398.8 *2*		0.40 ps *17*	
1865.2 *2*			
1987.8[@] *5*			
2265.7 *4*		215 fs *97*	
2323.8 *2*		24.9 fs *35*	
2587.2[@] *6*			
3024.8[&] *10*			
3042.8 *2*		0.80 ps *35*	
3114.0 *5*		14 fs *8*	
3129.5 *2*		6.9 fs *28*	
3550.5 *13*		<10 fs	
3580.1 *2*	5/2	1.7 ps *10*	
3614.9 *10*		<24 fs	
3741 *1*	3/2		
3884.7 *10*	3/2		E(level): fragment of ^{59}Ni(g.s.) IAS.
3904.0 *18*	3/2		E(level): fragment of ^{59}Ni(g.s.) IAS.
4000 *2*			
4051 *1*	1/2,3/2		
4108 *1*	3/2		
4301 *2*	(5/2)		J$^\pi$: if ^{59}Ni(339 level) analogue; not 7/2 from W(90°)/W(147°) for 4301γ.
4349 *1*	(1/2)		J$^\pi$: if ^{59}Ni(465 level) IAS.

† From Eγ of 1974Ne08 for E≤3616, except as noted; from 1978Sc07 for E>3616.
‡ Using measured W(90°)/W(147°) asymmetry, 1978Sc07 discard and propose spin for known l$_p$=1 and 3 transfers.
# From DSA measurements (1974Ne08).
@ Very weak γ rays de-excite level; Eγ not determined (1974Ne08).
& From Adopted Levels.

γ(^{59}Cu)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[‡]	E$_f$	J$^\pi_f$
491.0	1/2−	491.0 *1*	100	0.0	3/2−
913.8	5/2−	913.8 *1*	100	0.0	3/2−
1398.8		484.3 *4*	7	913.8	5/2−
		1398.8 *2*	93	0.0	3/2−
1865.2		465.8 *2*	18	1398.8	
		951.3 *4*	47	913.8	5/2−
1865.2		1865.7 *3*	35	0.0	3/2−
2265.7		1775.5[b] *5*	51	491.0	1/2−
		2265.9 *6*	49	0.0	3/2−
2323.8		1409.1 *4*	12	913.8	5/2−
		2324.0 *2*	88	0.0	3/2−
3042.8		455.6 *6*	2	2587.2	

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^{58}Ni(^{3}He,dγ) 1974Ne08,1978Sc07 (continued)

γ(^{59}Cu) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	δ[@]	Comments
3042.8		1177.4 *2*	25	1865.2				
		1644.2 *1*	73	1398.8				
3114.0		3114.0 *5*	100	0.0	3/2−			
3129.5		2215.7 *3*	32	913.8	5/2−			
		2638.6 *3*	23	491.0	1/2−			
		3129.5 *2*	45	0.0	3/2−			
3550.5		3550.5 *13*	100	0.0	3/2−			
3580.1	5/2	536.4 *11*	3	3042.8				
		1314.0 *2*	23	2265.7		D(+Q)	+0.07 *5*	δ: +0.02 to +0.12. W(90°)/W(147°)=1.32 *18* (1978Sc07).
		1592.3 *4*	10	1987.8		D+Q	−0.4 *3*	δ: −0.09 to −0.75. W(90°)/W(147°)=1.0 *3* (1978Sc07).
		1714.8 *4*	11	1865.2				W(90°)/W(147°)=0.99 *30* (1978Sc07).
		2182.3 *4*	14	1398.8		D+Q	+0.27 *20*	δ: +0.07 to +0.47. W(90°)/W(147°)=1.81 *54* (1978Sc07).
		2666.3 *2*	34	913.8	5/2−	D(+Q)	−0.13 *14*	δ: 0 to −0.27. W(90°)/W(147°)=0.76 *12* (1978Sc07).
		3579.9 *3*	5	0.0	3/2−	D+Q		δ: −0.27 to −0.38 or −1.54 to −1.96. W(90°)/W(147°)=3.21 *37* (1978Sc07).
3614.9		3614.9 *10*	100	0.0	3/2−			
3741	3/2	1753	10[a] *3*	1987.8		D+Q	−1.7 *16*	δ: −0.09 to −3.2. W(90°)/W(147°)=0.67 *31* (1978Sc07).
		2827	39[a] *4*	913.8	5/2−	D(+Q)	−0.06 *17*	δ: +0.10 to −0.23. W(90°)/W(147°)=1.05 *20* (1978Sc07).
		3250	40[a] *5*	491.0	1/2−	D+Q	−0.7 *6*	δ: −0.14 to −1.3. W(90°)/W(147°)=2.99 *74* (1978Sc07).
		3741	11[a] *2*	0.0	3/2−	Q(+D)	≤−0.25	W(90°)/W(147°)=1.53 *54* (1978Sc07).
3884.7	3/2	1896	13[a] *1*	1987.8		D		δ: +0.09 to −0.12. W(90°)/W(147°)=1.10 *14* (1978Sc07).
		3393	27[a] *5*	491.0	1/2−	D+Q		δ: −0.02 to −0.23 or −1.05 to −1.66. W(90°)/W(147°)=2.23 *42* (1978Sc07).
		3884	60[a] *7*	0.0	3/2−	D+Q	−0.20 *6*	W(90°)/W(147°)=0.92 *8* (1978Sc07).
3904.0	3/2	1916	11[a] *2*	1987.8		D		δ: −0.25 to +0.14. W(90°)/W(147°)=1.09 *25* (1978Sc07).
		2990	17[a] *4*	913.8	5/2−	D		δ: −0.31 to +0.27. W(90°)/W(147°)=1.18 *38* (1978Sc07).
		3413	17[a] *4*	491.0	1/2−	D(+Q)		δ: −0.04 *20* or −1.07 to −2.67. W(90°)/W(147°)=1.90 *68* (1978Sc07).
		3904	55[a] *6*	0.0	3/2−	D+Q	−0.21 *7*	W(90°)/W(147°)=0.93 *11* (1978Sc07).
4000		1676	44[a] *3*	2323.8				
		3509	41[a] *4*	491.0	1/2−			
		4000	15[a] *2*	0.0	3/2−			
4051	1/2,3/2	1026	9[&]	3024.8				W(90°)/W(147°)=1.63 *66* (1978Sc07).
		1727	10[&]	2323.8				W(90°)/W(147°)=0.78 *27* (1978Sc07).
		3560	25[&]	491.0	1/2−			W(90°)/W(147°)=1.82 *88* (1978Sc07).
		4051	56[&]	0.0	3/2−			W(90°)/W(147°)=0.86 *14* (1978Sc07).
4108	3/2	3194	71[a] *8*	913.8	5/2−	D+Q		δ: −0.09 to −0.5 or −1.19 to −3.1. W(90°)/W(147°)=0.84 *14* (1978Sc07).
		3617	24[a] *5*	491.0	1/2−	D(+Q)	−1.0 *11*	δ: +0.07 to −2.05. W(90°)/W(147°)=2.44 *95* (1978Sc07).
		4108	5[a] *2*	0.0	3/2−	D,Q		δ: ≤+0.09 or >+2.75. W(90°)/W(147°)=2.07 *15* (1978Sc07).
4301	(5/2)	2902	58[a] *4*	1398.8		D(+Q)		δ: −0.09 to +0.05 or −3.73 to −9.51. W(90°)/W(147°)=1.15 *14* (1978Sc07).

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^{58}Ni(^{3}He,dγ) 1974Ne08,1978Sc07 (continued)

γ(^{59}Cu) (continued)

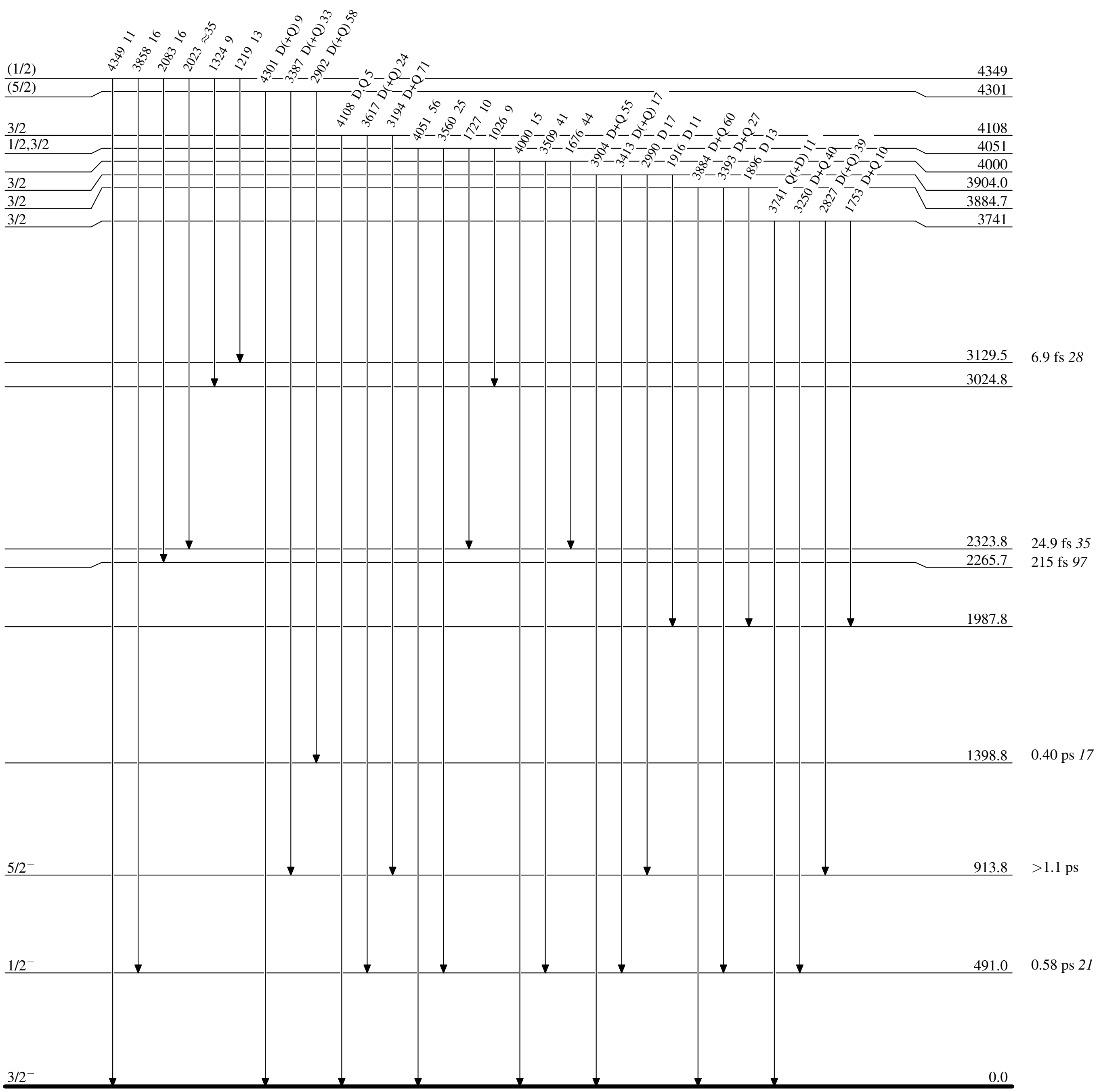
E_i(level)	J^π_i	E_γ[†]	I_γ[‡]	E_f	J^π_f	Mult.[#]	Comments
4301	(5/2)	3387	33[a] *8*	913.8	5/2$^-$	D(+Q)	δ: −0.05 *10* or +1.4 to +2.5. W(90°)/W(147°)=0.56 *8* (1978Sc07).
		4301	9[a] *2*	0.0	3/2$^-$	D(+Q)	δ: −0.16 to +0.27 or≥−2.75. I_γ: if δ=0. W(90°)/W(147°)=1.51 *66* (1978Sc07).
4349	(1/2)	1219	13[a]	3129.5			
		1324	9[a]	3024.8			
		2023 *8*	≈35[a]	2323.8			E_γ: Average of 2031γ and 2015γ (doublet). I_γ: For doublet.
		2083	16[a]	2265.7			
		3858	16[a]	491.0	1/2$^-$		
		4349	11[a]	0.0	3/2$^-$		

† From 1974Ne08 if ΔE quoted; from level energy differences of 1978Sc07 otherwise (recoil correction insignificant).
‡ % photon branching from each level; from 1974Ne08, except as noted.
# Assumed by evaluator for reported mixing ratios in 1978Sc07.
@ Average value, if reported range listed in comments section, deduced from W(90°)/W(147°) for γ rays coincident with 0° deuterons; m=1/2 substate population assumed (1978Sc07). Sign changed to follow phase convention of Krane and Steffen (1970Kr03) as of the ENSDF policy.
& Relative intensity at 90° (1978Sc07).
a Branching ratio (1978Sc07).
b Eγ=1755.5 in table 1 of 1974Ne08 is a misprint.

$^{58}Ni(^{3}He,d\gamma)$ 1974Ne08,1978Sc07

Level Scheme

Intensities: % photon branching from each level



$^{59}_{29}Cu_{30}$

$^{58}Ni(^{3}He,d\gamma)$ 1974Ne08,1978Sc07

Level Scheme (continued)

Intensities: % photon branching from each level