Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huo Junde, Huo Su, Yang Dong	NDS 112,1513 (2011)	29-Oct-2009

$Q(\beta^-)=-1.567\times10^4$ *syst*; $S(n)=16643.0$ *7*; $S(p)=7166.6$ *4*; $Q(\alpha)=-8000$ *7* 2012Wa38
Note: Current evaluation has used the following Q record −15303 SY16639 167165 11-7997 13 2003Au03.
$\Delta Q(\beta^-)=140$.
Other reaction: $^{24}Mg(^{32}S,X)$.

^{56}Ni Levels

Cross Reference (XREF) Flags

A	$^{58}Ni(p,t)$	E	$^{9}Be(^{57}Ni,^{56}NiX\gamma)$	I	$^{56}Ni(d,d')$:giant res
B	$^{54}Fe(^{3}He,n),(^{3}He,n\gamma),(\alpha,2n\gamma)$	F	$^{28}Si(^{32}S,2p2n\gamma)$	J	^{57}Zn εp decay:47 ms
C	$^{54}Fe(^{16}O,^{14}C),(^{12}C,^{10}Be)$	G	$^{28}Si(^{36}Ar,2\alpha\gamma)$	K	Coulomb excitation
D	^{56}Cu ε decay (93 ms)	H	$^{40}Ca(^{28}Si,3\alpha\gamma)$		

E(level)†	J^{π}‡	$T_{1/2}$&	XREF	Comments
0.0	0^+	6.075 d *10*	ABCDEFGH JK	%ε+%β⁺=100 $T_{1/2}$: from 1992Da15. Others: 6.10 d *2* (1963We06), 6.4 d *1* (1952Sh30), 6.0 d *5* (1952Wo15), 5.9 d *1* (1990Su13), and 5.8 d *6* (1961Mo10).
2700.6 *7*	2^+	53 fs *+34−17*	ABCDEFGH JK	β_2=0.173 *17*; B(E2)↑=0.060 *12* (1995Kr17); B(E2)↑=0.049 *12* (2004Yu10) T=0 (2001Bo54)
3923.6 *13*	4^+	>0.7 ps	ABCDEFGH	T=0 (2001Bo54)
3956.6 *13*	0^+		AB	
4932 *3*	$(3^-,5^-)$		A	
4935.5 *6*	(3^+)		A DEF	T=0 (2001Bo54)
5003.7 *13*	0^+		AB	
5315.7 *16*	6^+		ABC FGH	
5352.5 *8*	2^+		AB GH	
5483.7 *13*	4^+		AB D	T=0 (2001Bo54)
5665.1 *15*	5		AB EF	XREF: A(5679).
5799 *3*			A	
5988.1 *6*	4^+		A D	T=0 (2001Bo54) XREF: A(5985). $J^{\pi}=(3^+)$ and T=0,1 quoted in 2001Bo54 have been revised by the authors. The revised note further suggests that $J^{\pi}=(4^+)$ and T=0 are favored by shell-model calculations. L(p,t)=4.
6011 *3*	1^-		ABC	XREF: B(6000).
6236 *3*	(2^+)		A	
6326.4 *11*	4^+#		AB GH	
6405.8 *13*			B	
6431.9 *7*	4^+		A D	T=1 (2001Bo54) IAS of 4^+ g.s. in ^{56}Co.
6522.1 *18*	5		A F	
6554.6 *8*	(2^+)		AB	XREF: A(6572).
6588.6 *8*	(3^+)		CD	T=1 (2001Bo54) XREF: C(6570). $J^{\pi}=(3,4,5)^{(+)}$ and T=0,1 quoted in 2001Bo54 have been revised by the authors. The revised assignment is based on a comparison of energy differences of isobaric analog states in ^{56}Ni and ^{56}Cu.
6650.5 *15*	6^+		F H	
6654.8 *13*	0^+#		AB	T=0 (1974Na19) XREF: A(6662).

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Adopted Levels, Gammas (continued)

^{56}Ni Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
6730 *8*		A	
7025 *10*		AB	XREF: B(7060).
7144 *6*	1^-	AB	XREF: B(7120).
7250 *8*	(1^-)	A	
7289 *25*	(0^+)	A	
≈7400	(6^+)[@]	C	
7442.8 *13*	2^+	AB	T=1 (1970Br48) XREF: A(7433).
7576 *6*	3^-	AB	
7601.4 *17*	(7^+)	F H	
7652.6 *14*	6^+[#]	C GH	XREF: C(7650).
7670 *8*	0^+[#]	AB	XREF: B(7690).
7801 *10*	(1^-)	A	
7903.7 *10*	0^+	AB	T=1 (1974Na19) XREF: A(7913). IAS of 0^+ 1450 keV in ^{56}Co.
7954.7 *15*	8^+	B FGH	
8080 *30*	2^+[#]	ABC	
8143 *10*		A	
8223.7 *16*	8^+	FGH	
8479 *10*	2^+[#]	A	XREF: A(8520).
8575 *10*		A	
8674 *8*	2^+[#]	AB	XREF: B(8690).
8778.5 *17*	(7)	C F H	XREF: C(8700).
8796 *6*	4^+	A	
8870 *12*		ABC G	
9009.7 *17*	9^+	AB F H	
9042 *8*		A	
9109 *8*	(4^+)[@]	A C	XREF: C(9100).
9154 *10*		A	
9240.5 *22*	(8^+)	A F	
9309.5 *17*	8^+[#]	AB GH	
9418.3 *17*	10^+	B FGH	
9450 *8*	(2^+)[#]	AB	
9477.7 *17*	(9^+)	F H	
9596 *6*		A	
9676 *6*		A	
9735.5 *19*	7[@]	ABC G	%p≈100 XREF: B(9720)C(9700). This level decays by protons to $7/2^-$, g.s. in ^{55}Co. E(p)(lab)=2540 *30*, observed in (proton)(summed γ) coin spectrum.
9756 *5*	(0^+)[#]	AB	
9824 *3*		A	
9943 *4*	0^+	ABC	T=2 (1984Ka07) Double IAS of 0^+ g.s. in ^{56}Fe.
9994 *3*	0^+	A	
10011 *6*	0^+	AB	T=2 (1984Ka07)
10041 *6*	0^+	A	T=2 (1984Ka07)
10055 *3*		A	
10095 *5*		A	
10150 *5*		A	
10250 *6*	0^+[#]	BC	
10331 *10*		A	

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Adopted Levels, Gammas (continued)

^{56}Ni Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	XREF	Comments
10377 *10*		A	
10428 *8*		A	
10469.7 *18*	9	F H	
10655 *10*	(4$^+$)[@]	ABC	XREF: C(10550).
10677.3 *17*	10$^+$	FGH	
10820 *20*	2$^+$[#]	AB	XREF: A(10785).
10854 *10*		A	
10935.5 *18*	9[@]	B GH	XREF: B(10950).
11001.8 *18*	(10$^+$)	H	
11055 *15*		A	
11294.7 *20*	(10$^+$)[#]	BC GH	XREF: B(11200)C(11300).
11420.6 *17*	11$^+$	B F H	XREF: B(11500).
11800 *30*	2$^+$[#]	BC	
11866.7 *22*	(10$^+$)	B F H	XREF: B(12000).
12358.8 *18*	12$^+$	B F H	XREF: B(12300).
12508.5 *19*	11[@]	F H	
13505.7 *18*	(12)	F H	
13578 *3*	12$^+$[#]	GH	
13644.4 *24*	(12$^+$)	GH	J$^{\pi}$: from earlier paper 2006Jo03 from the same group as 2008Jo04.
14454.5 *21*	13[@]	GH	
14735 *3*	14$^+$	GH	
15.3×10^3 *2*		C	
16358 *4*	13	GHI	XREF: I(16200).
16773 *3*	15[@]	GH	
18632 *5*	(16$^+$)	G	
19521 *5*	17[@]	G I	XREF: I(19300).
22459 *7*		G	

[†] For states connected by gammas, the excitation energies are from Eγ by using a least-squares adjustment procedure. The rest are from ^{58}Ni(p,t), except as noted.
[‡] From L transfer in ^{58}Ni(p,t), except as noted.
[#] From L transfer in ^{54}Fe(^{3}He,n).
[@] From L transfer in ^{54}Fe(^{16}O,^{14}C), (^{12}C,^{10}Be).
[&] From DSA in ^{54}Fe(^{3}He,n), (^{3}He,nγ).

γ(^{56}Ni)

E$_i$(level)	J$^{\pi}_i$	E$_{\gamma}$[†]	I$_{\gamma}$[†a]	E$_f$	J$^{\pi}_f$	Mult.[†]	Comments
2700.6	2$^+$	2700.6[‡] *3*	100[‡] *3*	0.0	0$^+$	E2	B(E2)(W.u.)=5.8 *+19−38*
3923.6	4$^+$	1224.5[‡] *2*	100[‡] *5*	2700.6	2$^+$	E2	B(E2)(W.u.)<23
3956.6	0$^+$	1256[&]		2700.6	2$^+$		
4935.5	(3$^+$)	1010.4[‡] *4*	100[‡] *17*	3923.6	4$^+$		
		2234.5[‡] *7*	60[‡] *16*	2700.6	2$^+$		
5003.7	0$^+$	2303[&]		2700.6	2$^+$		
5315.7	6$^+$	1392[#] *1*	100[#] *4*	3923.6	4$^+$	E2[#]	
5352.5	2$^+$	2650 *1*	60 *20*	2700.6	2$^+$	D+Q	
		5351 *2*	100 *20*	0.0	0$^+$	E2	
5483.7	4$^+$	2780.4 *4*	14.5 *12*	2700.6	2$^+$		

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Adopted Levels, Gammas (continued)

$\gamma(^{56}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†a]	E_f	J^π_f	Mult.[†]
5665.1	5	1741[#] 1	100[#] 10	3923.6	4^+	D
5988.1	4^+	2062.8[‡] 4	100[‡] 27	3923.6	4^+	
		3287.4[‡] 5	78[‡] 10	2700.6	2^+	
6326.4	4^+	976 1	67 17	5352.5	2^+	E2
		2402 1	25 8	3923.6	4^+	
		3626 1	100 8	2700.6	2^+	E2
6405.8		3705[&]		2700.6	2^+	
6431.9	4^+	950.7[‡] 5	15[‡] 2	5483.7	4^+	
		2506.7[‡] 3	100[‡] 5	3923.6	4^+	
6522.1	5	857[#] 1	100[#] 11	5665.1	5	
6554.6	(2^+)	3854[&]		2700.6	2^+	
		6554[&]		0.0	0^+	
6588.6	(3^+)	1653.1[‡] 4	5.9[‡] 13	4935.5	(3^+)	
6650.5	6^+	2726[#] 1	100[#] 20	3923.6	4^+	E2[#]
6654.8	0^+	3954[&]		2700.6	2^+	
7442.8	2^+	4742[&]		2700.6	2^+	
7601.4	(7^+)	2285[#] 1	100[#] 18	5315.7	6^+	(E2+M1)[#]
7652.6	6^+	1326 1	100 17	6326.4	4^+	E2
		3729 2	4 4	3923.6	4^+	E2
7903.7	0^+	2551[&]	11[&] 6	5352.5	2^+	
		5203[&]	100[&] 6	2700.6	2^+	
7954.7	8^+	1304[#] 1	8[#] 1	6650.5	6^+	E2[#]
		2638[#] 1	100[#] 6	5315.7	6^+	E2[#]
8223.7	8^+	2908[#] 1	100[#] 8	5315.7	6^+	E2[#]
8778.5	(7)	3114[#] 2	<48[#]	5665.1	5	
		3462[#] 1	100[#] 19	5315.7	6^+	
9009.7	9^+	787[#] 1	82[#] 7	8223.7	8^+	E2+M1[#]
		1055[#] 1	100[#] 8	7954.7	8^+	E2+M1[#]
9240.5	(8^+)	3924[#] 2	100[#] 27	5315.7	6^+	(E2)[#]
9309.5	8^+	1657 1	100 12	7652.6	6^+	E2
9418.3	10^+	1463[#] 1	100[#] 6	7954.7	8^+	E2[#]
9477.7	(9^+)	1523[#] 1	100[#] 19	7954.7	8^+	(E2+M1)[#]
		1876[#] 2	67[#] 19	7601.4	(7^+)	[#]
9735.5	7	845 2	1×10^2 1	8870		(E2)
		2083 2	1×10^2 1	7652.6	6^+	
10469.7	9	2515[#] 1	100[#] 38	7954.7	8^+	D[#]
10677.3	10^+	2453[#] 1	100[#] 15	8223.7	8^+	E2[#]
10935.5	9	1200 1	100 12	9735.5	7	E2
		1626 1	52 8	9309.5	8^+	D
11001.8	(10^+)	3047[@] 1	100[@] 25	7954.7	8^+	(E2)[@]
11294.7	(10^+)	1987[@] 1	1.0×10^2[@] 5	9309.5	8^+	
11420.6	11^+	2002[#] 1	3.7[#] 16	9418.3	10^+	E2+M1[#]
		2412[#] 1	3.2[#] 6	9009.7	9^+	E2[#]
11866.7	(10^+)	2626[@b] 2	<35[@]	9240.5	(8^+)	
		3912[@] 2	100[@] 21	7954.7	8^+	(E2)[@]

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Adopted Levels, Gammas (continued)

$\gamma(^{56}Ni)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†a]	E_f	J^π_f	Mult.[†]
12358.8	12^+	1681[#] *1*	61[#] *10*	10677.3	10^+	E2[#]
		2940[#] *1*	100[#] *14*	9418.3	10^+	E2[#]
12508.5	11	1212[@] *1*	61[@] *11*	11294.7	(10^+)	
		1573[@] *1*	100[@] *15*	10935.5	9	E2[@]
13505.7	(12)	1146[@] *1*	61[@] *11*	12358.8	12^+	
		2086[@] *1*	100[@] *15*	11420.6	11^+	
13578	12^+	2282 *2*	100 *18*	11294.7	(10^+)	E2
13644.4	(12^+)	2349 *3*	10×10^2 *3*	11294.7	(10^+)	
		4226 *2*	7×10^1 *3*	9418.3	10^+	
14454.5	13	1946 *1*	100 *14*	12508.5	11	E2
14735	14^+	2377 *2*	9 *3*	12358.8	12^+	E2
16358	13	2779 *3*	100 *33*	13578	12^+	D
16773	15	2318 *2*	100 *7*	14454.5	13	E2
18632	(16^+)	3897 *4*	<100	14735	14^+	
19521	17	2748 *4*	100 *14*	16773	15	E2
22459		2938[@] *4*	1.0×10^2[@] *5*	19521	17	[@]

† From $^{28}Si(^{36}Ar,2\alpha\gamma)$, except as noted.

‡ From ^{56}Cu ε decay.

\# From $^{28}Si(^{32}S,2p2n\gamma)$.

@ From $^{40}Ca(^{28}Si,3\alpha\gamma)$.

& From $^{54}Fe(^{3}He,n\gamma)$ and $(\alpha,2n\gamma)$.

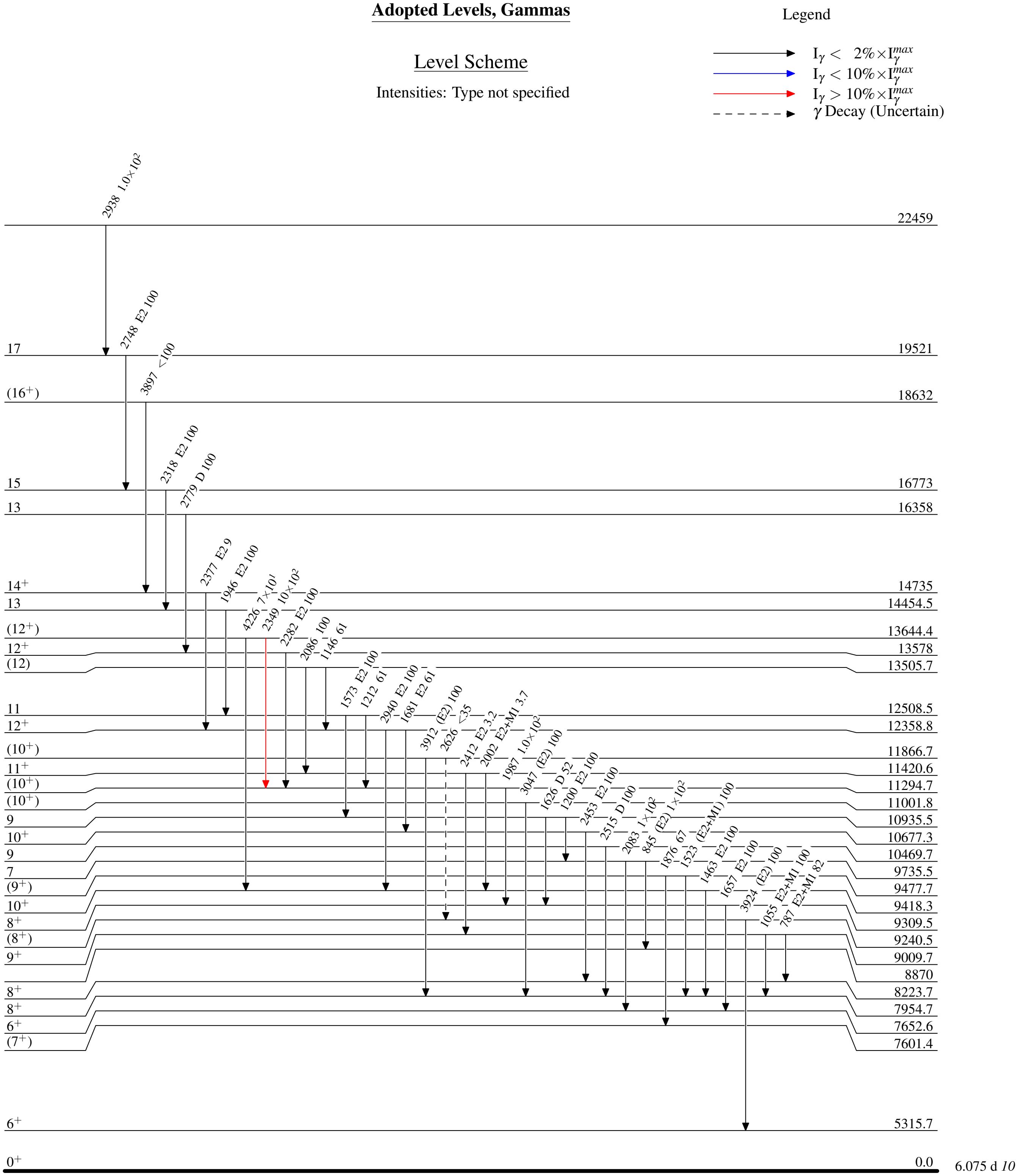
a Relative photon branching from each level renormalized to 100 for the strongest branching.

b Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Type not specified



$^{56}_{28}Ni_{28}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified