^{56}Fe(p,γ)

	Type	Author	History Citation	Literature Cutoff Date
	Full Evaluation	M. R. Bhat	NDS 85, 415 (1998)	24-Sep-1998

1991El01: E=1.9− 2.5 MeV, $\gamma(\theta)$.
1987Br03: E=1.6, 1.64 MeV, $T_{1/2}$ by pulsed beam-γ-delay timing.
1986El06: E=3.774, 3.794 MeV, $\gamma(\theta)$.
1986Ra19: E=1.248− 2.065 MeV, $\gamma(\theta)$.
1985El09: E=3.694− 3.855 MeV, $\gamma(\theta)$.
1978Fo20: E=3.728, 3.735 MeV, $\gamma(\theta)$.
1983Av05: E= 3.7 MeV, DSA.
1979Ra13: E=3.7− 3.8 MeV, p$\gamma(\theta)$.
1981El05: E=1.3− 1.9 MeV, $\gamma(\theta)$.
1970Ob02: E=1.210− 2.575 MeV, p$\gamma(\theta)$.
1971Le21: E=1.247− 1.652 MeV, $\gamma(\theta)$.
1975El01: E=1.2− 3.0 MeV, $\gamma(\theta)$.
1974Es01: E=1.2− 1.5 MeV, p$\gamma(\theta)$.
Others: 1970Br20 and 1966Au01. See also 1977Au04.
Level energies and gammas are extracted from the above data sets with uncertainties given where available.

^{57}Co Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[@]	Comments
0.0	7/2$^-$		
1223.9 3	9/2$^-$	54 fs 8	J=9/2 from $\gamma(\theta)$ (1970Ob02).
1377.8 3	3/2$^-$	19 ps 10	$T_{1/2}$: from 1987Br03 by pulsed beam-γ-delay timing.
1504.8 3	1/2$^-$		
1690.4	11/2$^-$	132 fs 21	
1757.7 3	3/2$^-$	263 fs 22	J=3/2 from $\gamma(\theta)$ (1970Ob02).
1896.4 3	7/2$^-$	59 fs 9	
1919.6 4	5/2$^-$	21 fs 6	
2132.9 4	5/2$^-$	277 fs +69−28	
2312.5	7/2$^-$	139 fs +28−14	
2479.0 10			
2486.2	9/2$^-$	68 fs 15	
2514.0 10			
2560.3	(7/2$^-$,9/2,11/2$^-$)	0.35 ps +21−6	
2611	7/2$^-$		J=7/2 from $\gamma(\theta)$; π=− from RUL for the primary γ transition from the E(p)=3720 J^π=9/2$^+$ resonance (1985El09).
2614.5 10			
2723.0			
2730.8 4	3/2$^-$,5/2	97 fs +7−14	
2743.8	(9/2,11/2,13/2)	47 fs 21	
2802.8 4	(3/2$^-$,5/2)	40 fs 8	
2879.1 4	3/2$^-$	111 fs 21	
2981.0 6			
3108.3 5	(3/2)$^-$	54 fs 12	
3176.8 5	5/2$^-$,7/2$^-$	152 fs 35	
3184	3/2$^+$,5/2$^+$		
3269.8 20	5/2$^-$,7/2$^-$		
3296			
3357.0 18	3/2$^-$[#]		
3431.1 20			
3459	(3/2$^-$,5/2,7/2$^-$)		
3467	3/2$^-$[#]		

^{56}Fe(p,γ) (continued)

^{57}Co Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	Comments
3520		
3536.0 *20*		
3554	3/2$^+$,5/2$^+$	
3674		
3701 *2*	(7/2$^-$)	
3723 *3*	(1/2$^+$)	
3850.7 *20*		
3856 *2*	3/2$^+$,5/2$^+$	
3901 *2*		
3918	5/2$^-$,7/2$^-$	
3993 *3*	5/2	J=5/2 from $\gamma(\theta)$ of primary γ rays from E(p)=1408, J=5/2 resonance (1974Es01).
4001		
4046		
4064	3/2$^-$[#]	
4195 *4*	1/2$^-$,3/2$^-$	
4238		
4298		
4586	9/2$^{(+)}$	J=9/2 from $\gamma(\theta)$; π=(+) from a comparison of the δ for the primary γ transition from the E(p)=3720 J^{π}=9/2$^+$ resonance with single particle estimates (1985El09).
4597	9/2$^+$	J^{π}: 9/2$^{(+)}$ from $\gamma(\theta)$ and comparison of the δ for the primary γ transition from the E(p)=3727 J^{π}=9/2$^+$ resonance with single particle estimates (1979Ra13).
4605		
4675	5/2$^+$	J^{π}: 5/2$^{(+)}$ from $\gamma(\theta)$ and comparison of the δ for the primary γ transition from the E(p)=3774 and 3794 J^{π}=5/2$^+$ resonances with single particle estimates (1986El06).

[†] From the references given above.

[‡] From Adopted Levels; supporting arguments from this data set are indicated.

[#] J=3/2 from $\gamma(\theta)$ of primary γ rays from E(p)=1416, J=5/2 resonance (1974Es01).

[@] From DSA in 1983Av05, unless indicated otherwise.

$^{56}\text{Fe}(p,\gamma)$ **(continued)**

$\gamma(^{57}\text{Co})$

E_i(level)	J_i^π	E_γ‡	I_γ#	E_f	J_f^π	Mult.†	δ†	α[c]	Comments
1223.9	9/2⁻	1223.9	100	0.0	7/2⁻	M1+E2	+0.26 1		
1377.8	3/2⁻	1377.8	100	0.0	7/2⁻	(E2)			
1504.8	1/2⁻	127.0	100	1377.8	3/2⁻	M1+E2	+0.008 14	0.0221 1	
1690.4	11/2⁻	1690.4	100	0.0	7/2⁻	E2			
1757.7	3/2⁻	1757.7	100	0.0	7/2⁻	E2			
1896.4	7/2⁻	672.5	55[@]	1223.9	9/2⁻	(M1+E2)	+0.02 1		Mult.: D+Q with δ=+ 0.09 6 from $\gamma(\theta)$ (1970Ob02).
		1896.4	45[@]	0.0	7/2⁻	(M1(+E2))	−0.04 22		
1919.6	5/2⁻	541.8	≈2[@]	1377.8	3/2⁻				
		1919.6	≈98[@]	0.0	7/2⁻	M1+E2	−0.23 3		Mult.: D+Q with δ=− 0.24 3 from $\gamma(\theta)$ (1970Ob02).
2132.9	5/2⁻	755.1	≈13[@]	1377.8	3/2⁻	M1+E2	−0.35 +18−9		
		2132.9	≈87[@]	0.0	7/2⁻	(M1(+E2))	0.00 5		
2312.5	7/2⁻	934.7	30	1377.8	3/2⁻	E2			
		1088.6		1223.9	9/2⁻	M1+E2	+0.13 2		
		2312.5	70	0.0	7/2⁻	(M1(+E2))	−0.4 6		
2486.2	9/2⁻	795.8	18	1690.4	11/2⁻	(M1,E2)			
		1262.3	28	1223.9	9/2⁻	(M1,E2)			
		2486.2	54	0.0	7/2⁻	(M1,E2)			
2560.3	(7/2⁻,9/2,11/2⁻)	869.9	63	1690.4	11/2⁻	D,E2			
		2560.3	37	0.0	7/2⁻	D,E2			
2723.0		1499.1	100	1223.9	9/2⁻				
2730.8	3/2⁻,5/2	2730.8	100	0.0	7/2⁻	D,E2			
2743.8	(9/2,11/2,13/2)	1053.4	100	1690.4	11/2⁻	(D)			
2802.8	(3/2⁻,5/2)	906.4	38	1896.4	7/2⁻	D			
		1045.1	36	1757.7	3/2⁻	D			
		2802.8	26	0.0	7/2⁻	D,E2			
2879.1	3/2⁻	959.5	42	1919.6	5/2⁻				
		1121.4	22	1757.7	3/2⁻				
		2879.1	36	0.0	7/2⁻	E2			
2981.0		1084.6	100	1896.4	7/2⁻				
3108.3	(3/2)⁻	1730.5		1377.8	3/2⁻				
		3108.3		0.0	7/2⁻				
3176.8	5/2⁻,7/2⁻	1280.4	55	1896.4	7/2⁻				
		3176.8	45	0.0	7/2⁻				
3269.8	5/2⁻,7/2⁻	1510.3[d]	44	1757.7	3/2⁻				
		3268	56	0.0	7/2⁻				
3357.0	3/2⁻	1979.2		1377.8	3/2⁻				
		3357		0.0	7/2⁻				
3459	(3/2⁻,5/2,7/2⁻)	3459	100	0.0	7/2⁻				
3520		1033.8	100	2486.2	9/2⁻				
3554	3/2⁺,5/2⁺	1796.3	46	1757.7	3/2⁻				
		2176.2	54	1377.8	3/2⁻				

From ENSDF

^{56}Fe(p,γ) (continued)

γ(^{57}Co) (continued)

E_i(level)	J^π_i	E_γ‡	I_γ#	E_f	J^π_f	Mult.†	δ†	Comments
3674		1777.6	100	1896.4	7/2$^-$			
3701	(7/2$^-$)	3701	100	0.0	7/2$^-$			
3723	(1/2$^+$)	3723	100	0.0	7/2$^-$			
3856	3/2$^+$,5/2$^+$	2351.2	≈50@	1504.8	1/2$^-$			
		2478.2	≈50@	1377.8	3/2$^-$			
		3856	≈3@	0.0	7/2$^-$			
3901		3901	100	0.0	7/2$^-$			
3918	5/2$^-$,7/2$^-$	2413.2	100	1504.8	1/2$^-$			
3993	5/2	2235.3	10&	1757.7	3/2$^-$			
		3993	90&	0.0	7/2$^-$	D+Q	+0.06 8	Mult.: D+Q with δ=+ 0.06 8 from γ(θ) (1970Ob02).
4001		2243.3	100	1757.7	3/2$^-$			
4195	1/2$^-$,3/2$^-$	4195	100	0.0	7/2$^-$			
4238		4238	100	0.0	7/2$^-$			
4298		2920.2	100	1377.8	3/2$^-$			
4586	9/2$^{(+)}$	2275	65^a	2312.5	7/2$^-$			
		4586	35^a	0.0	7/2$^-$			
4597	9/2$^+$	2286	50^b 20	2312.5	7/2$^-$	(E1(+M2))	−0.18 18	Mult.: D+Q from γ(θ); E1(+M2) with δ=− 0.18 18 from ΔJ^π (1979Ra13).
		4597	50^b 25	0.0	7/2$^-$			

† From adopted gammas; supporting arguments from this data set are indicated.

‡ From the references given above.

Percent photon branching from each level from 1986Ra19, unless indicated otherwise.

@ From 1970Ob02.

& From 1971Le21.

^{a} From 1985El09.

^{b} From 1979Ra13.

^{c} Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
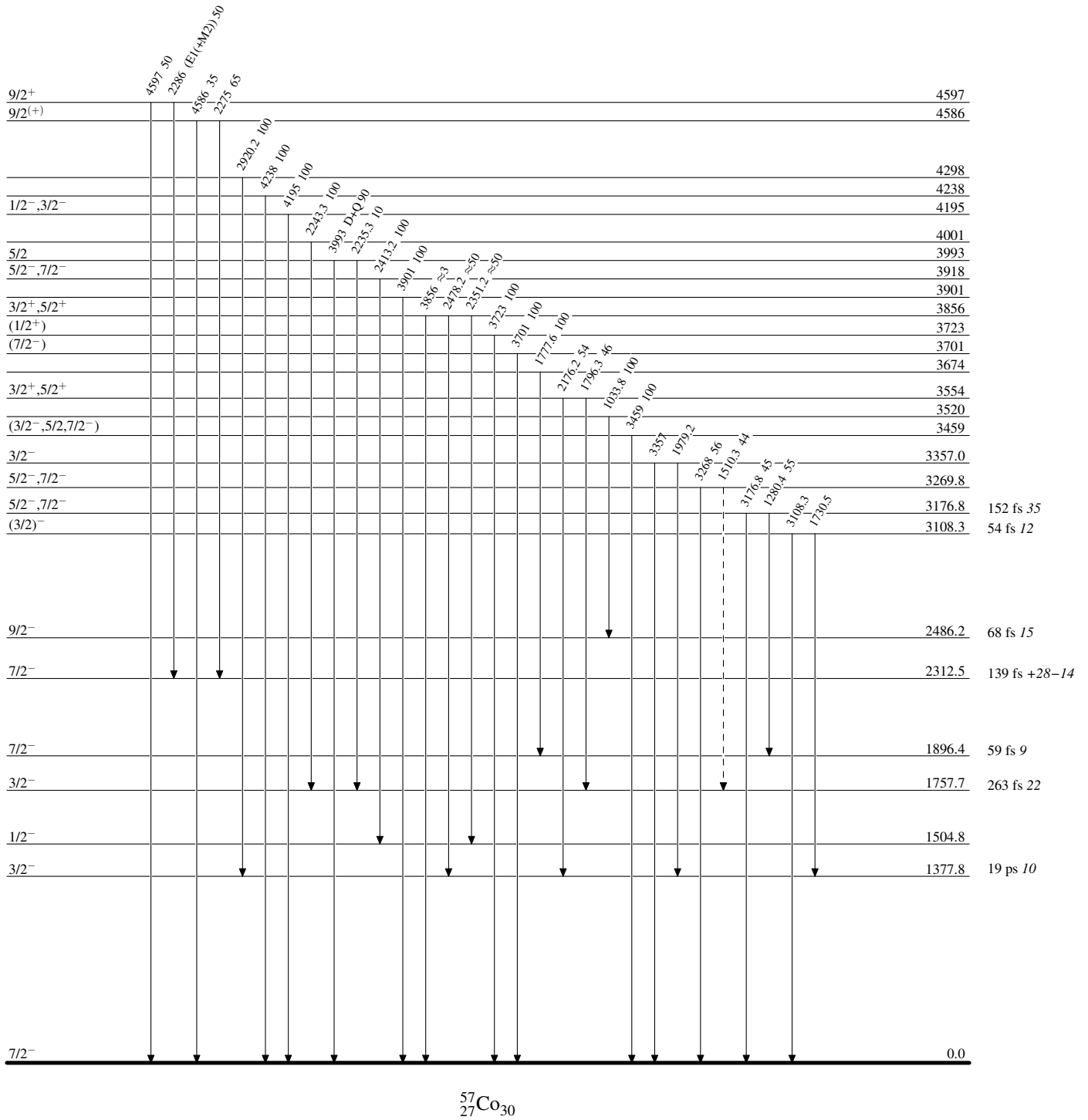
^{d} Placement of transition in the level scheme is uncertain.

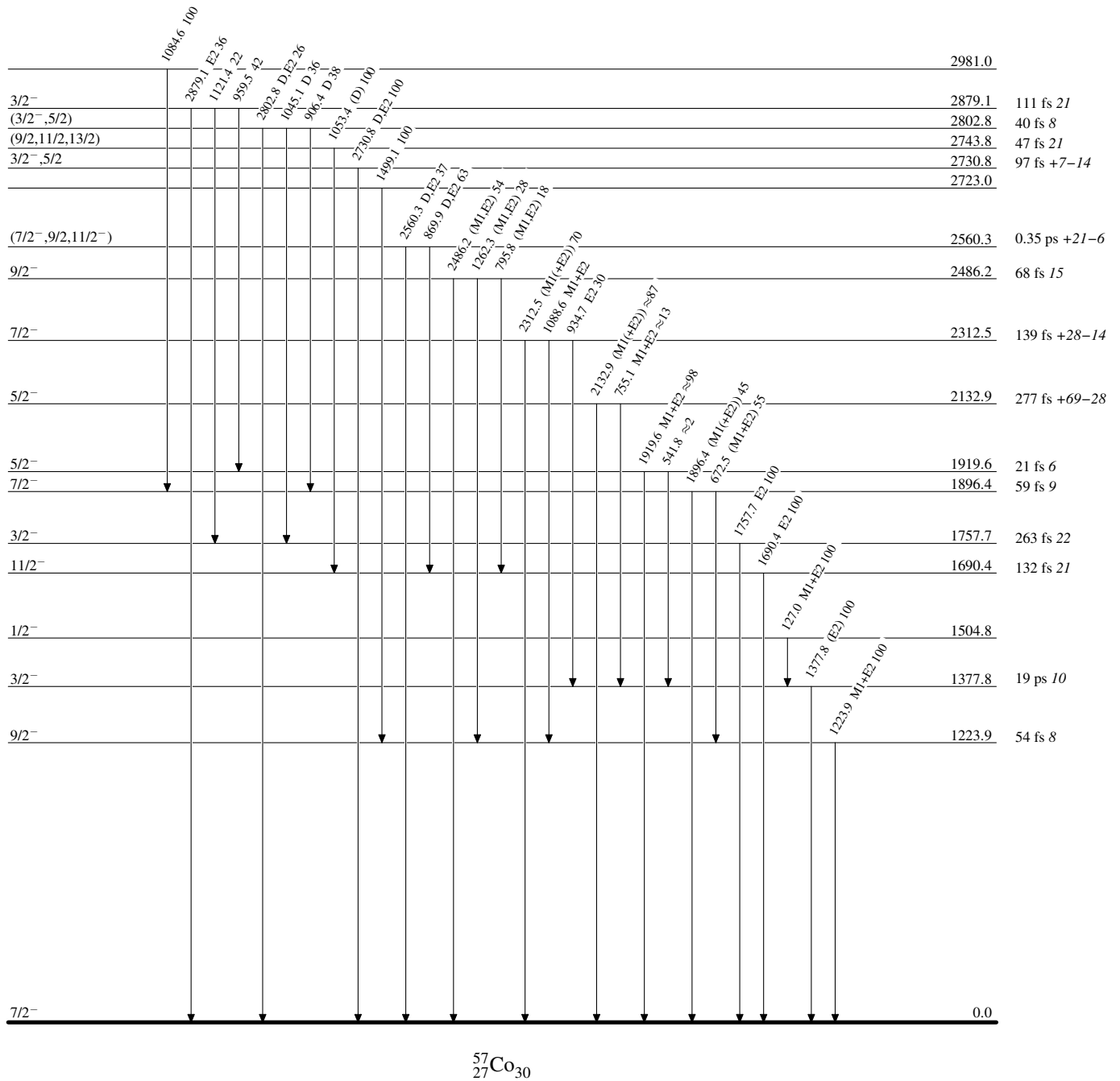## $^{56}\text{Fe}(p,\gamma)$

Legend

Level Scheme

Intensities: % photon branching from each level

$- - - - - \blacktriangleright \; \gamma$ Decay (Uncertain)

^{56}Fe(p,γ)

Level Scheme (continued)

Intensities: % photon branching from each level

$^{57}_{27}$Co$_{30}$