

$^{56}\text{Fe}(\text{n},\text{n}'\gamma)$ 1974La23,1974La07,1983Ko39

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

Others: 1989Ge09, 1983WeZW.

1974La23: E=2.5-1.4 MeV, measured $E\gamma$, $\sigma(E(\text{n}),E\gamma,\theta)$.

1974La07: E=14.1 MeV, measured $E\gamma$, $\sigma(E(\text{n}),E\gamma,\theta)$.

1983Ko39: E=1-8 MeV, measured $E\gamma$, $I\gamma$, DSA.

1989Ge09: E: fast reactor neutrons, simultaneous measurement using two targets with fixed geometry.

1983WeZW: E=4.3 MeV, measured DSA.

Others: see 1987Hu04, 1985Ko42, 1986La20, 1988Ge02.

All data from 1974La07 and 1974La23, except as noted.

 ^{56}Fe Levels

E(level) [†]	J ^π #	T _{1/2} [@]	Comments
0.0	0 ⁺		
846.8	2 ⁺ [‡]		
2085.1	4 ⁺ [‡]	0.59 ps +17-14	
2657.6	2 ⁺ [‡]	21 ^b fs 1	
2941.7 3	0 ⁺ [‡]	0.45 ps +21-12	
2960.0	2 ⁺ [‡]	28 ^a fs 3	T _{1/2} : other: 54 fs 6 (1983Ko39).
3120.0 3	(1 ⁺)	19 ^a fs 1	J ^π : J ^π =0 ⁺ from $\sigma(E)$ (1972Ro26); 1 ⁺ from $\sigma(E)$ (1974La07). T _{1/2} : other: 42 fs 3 (1983Ko39).
3123.0	4 ⁺ [‡]	47 ^a ps 12	T _{1/2} : 0.07 ps +21-2 (1983Ko39).
3370.2	2 ⁺ [‡]	17 ^a fs 3	T _{1/2} : other: 17 fs +7-5 (1983Ko39).
3388.1 3	6 ⁺ [‡]	>0.55 ^{&} ps	
3445.4	3 ⁺ [‡]	29 ^b fs 5	T _{1/2} : other: 35 fs (1983WeZW).
3449.3 5	1 ⁽⁺⁾	8 fs 3	T _{1/2} : from weighted average values of 1989Ge09 and 1983WeZW.
3601.9 3	2 ⁺ [‡]	0.15 ^a ps 4	T _{1/2} : other: ≈69.3 fs (1983WeZW).
3607.0 10	0 ⁽⁺⁾	52 ^a fs 21	
3755.0 10	6 ⁺ [‡]	0.13 ^a ps 5	T _{1/2} : others: 0.152 ps (1983WeZW), 0.13 ps +7-4 (1983Ko39).
3832.0 9	2 ⁺ [‡]	39 ^b fs 5	
3856.5	3 ⁺ [‡]	25 ^b fs 3	
4049.0	3 ⁺	7 ^a fs 3	T _{1/2} : others: 10 fs (1983WeZW), 35 fs +7-5 (1983Ko39).
4100.3	4 ⁺	43 ^b fs 5	
4120.0	3 ⁺	0.14 ^a ps 4	T _{1/2} : others: 35 fs (1983WeZW), 0.23 ps +8-6 (1983Ko39).
4298.2	4 ⁺		
4302.0 10	0 ⁺		
4395.0	3 ⁺	35 ^a fs 17	
4401.0 9	2 ⁺		
4458.4	4 ⁺	26 fs +12-8	
4510.0 4	3 ⁻	83 ^a fs 28	T _{1/2} : other: 0.17 ps +7-4 (1983Ko39).
4539.5 9	1 ⁺ ,2 ⁺	25 fs +20-14	
4554.0 3	2 ⁺ ,3 ⁺ ,4 ⁺		
4612.3 7			
4660.0 10	2 ⁺ ,3 ⁺ ,4 ⁺		
4684.7 10	4 ⁺		
4729.9 10	0 ⁺ ,2 ⁺		
4739.6	2 ⁺ ,3 ⁺ ,4 ⁺		
4878.0 10	2 ⁺		
4887.0 10			
5023.7 10			

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$^{56}\text{Fe}(\text{n},\text{n}'\gamma)$ 1974La23,1974La07,1983Ko39 (continued) ^{56}Fe Levels (continued)

<u>E(level)[†]</u>	<u>J^π#</u>	<u>E(level)[†]</u>	<u>E(level)[†]</u>	<u>E(level)[†]</u>	<u>J^π#</u>
5122.0 10		5231.0 10	5512.0 10	5985.0 10	
5148.0 10		5305.0 10	5795.0 10	6092.3 10	(3 ⁻)
5186.5 10	(1 ⁻)	5402.0 10	5870.0 10		

[†] From 1974La07 and 1974La23, authors' values based on their E(γ) values. Energies without uncertainties are those adopted by the authors from β decay.

[‡] Based on $\gamma(\theta)$ (1974La23 and 1974La07) and summary of transition strengths extracted from T_{1/2} and I γ (1983Ko39 and 1983WeZW), except as noted.

From Adopted Levels.

@ DSA, from 1983Ko39, except as noted.

& DSA, from 1983WeZW. $\Delta T_{1/2} \geq 20\%$.

^a From 1989Ge09.

^b From weighted average values of 1989Ge09 and 1983Ko39.

 $\gamma(^{56}\text{Fe})$

<u>Eγ</u>	<u>Iγ[†]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Eγ</u>	<u>Iγ[†]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>
632.0	≤2	3755.0	6 ⁺	3123.0	4 ⁺	2015.2		4100.3	4 ⁺	2085.1	4 ⁺
846.8	100	846.8	2 ⁺	0.0	0 ⁺	2034.9		4120.0	3 ⁺	2085.1	4 ⁺
955.8	16 2	4401.0	2 ⁺	3445.4	3 ⁺	2063.7		5023.7		2960.0	2 ⁺
1010.0		5305.0		4298.2	4 ⁺	2082.0	80	4739.6	2 ⁺ ,3 ⁺ ,4 ⁺	2657.6	2 ⁺
1037.9	99	3123.0	4 ⁺	2085.1	4 ⁺	2094.9 3	100	2941.7	0 ⁺	846.8	2 ⁺
1055.0		4887.0		3832.0	2 ⁺	2113.2	98	2960.0	2 ⁺	846.8	2 ⁺
1064.6	3 2	4510.0	3 ⁻	3445.4	3 ⁺	2141.8	100	5512.0		3370.2	2 ⁺
1108.6	8 5	4554.0	2 ⁺ ,3 ⁺ ,4 ⁺	3445.4	3 ⁺	2213.1	10	4298.2	4 ⁺	2085.1	4 ⁺
1137.5	100	5186.5	(1 ⁻)	4049.0	3 ⁺	2273.2	100	3120.0	(1 ⁺)	846.8	2 ⁺
1174.4	26 3	3832.0	2 ⁺	2657.6	2 ⁺	2373.2	59	4458.4	4 ⁺	2085.1	4 ⁺
1175.2	64	4298.2	4 ⁺	3123.0	4 ⁺	2424.9	16 2	4510.0	3 ⁻	2085.1	4 ⁺
1191.7		5023.7		3832.0	2 ⁺	2460.3	100	5402.0		2941.7	0 ⁺
1238.3	100	2085.1	4 ⁺	846.8	2 ⁺	2468.9	77 5	4554.0	2 ⁺ ,3 ⁺ ,4 ⁺	2085.1	4 ⁺
1272.0	8	4395.0	3 ⁺	3123.0	4 ⁺	2523.4	87	3370.2	2 ⁺	846.8	2 ⁺
1303.0 5	100	3388.1	6 ⁺	2085.1	4 ⁺	2574.9	60 10	4660.0	2 ⁺ ,3 ⁺ ,4 ⁺	2085.1	4 ⁺
1335.4	38	4458.4	4 ⁺	3123.0	4 ⁺	2598.6	79	3445.4	3 ⁺	846.8	2 ⁺
1360.3	20	3445.4	3 ⁺	2085.1	4 ⁺	2602.5	50 6	3449.3	1 ⁽⁺⁾	846.8	2 ⁺
1431.0	15 5	4554.0	2 ⁺ ,3 ⁺ ,4 ⁺	3123.0	4 ⁺	2643.0		6092.3	(3 ⁻)	3449.3	1 ⁽⁺⁾
1459.3	6 2	4401.0	2 ⁺	2941.7	0 ⁺	2657.6	2	2657.6	2 ⁺	0.0	0 ⁺
1537.0	7 5	4660.0	2 ⁺ ,3 ⁺ ,4 ⁺	3123.0	4 ⁺	2722.1		6092.3	(3 ⁻)	3370.2	2 ⁺
1574.4		5023.7		3449.3	1 ⁽⁺⁾	2750.0		5870.0		3120.0	(1 ⁺)
1579.5	57 8	4539.5	1 ⁺ ,2 ⁺	2960.0	2 ⁺	2755.1	35 10	3601.9	2 ⁺	846.8	2 ⁺
1616.6	20	4739.6	2 ⁺ ,3 ⁺ ,4 ⁺	3123.0	4 ⁺	2760.2	100	3607.0	0 ⁽⁺⁾	846.8	2 ⁺
1652.3	53 10	4612.3		2960.0	2 ⁺	2792.9	24	4878.0	2 ⁺	2085.1	4 ⁺
1669.9	100	3755.0	6 ⁺	2085.1	4 ⁺	2960.0	2	2960.0	2 ⁺	0.0	0 ⁺
1724.7	100	4684.7	4 ⁺	2960.0	2 ⁺	2985.2	63 4	3832.0	2 ⁺	846.8	2 ⁺
1771.5	92	3856.5	3 ⁺	2085.1	4 ⁺	3009.7	6	3856.5	3 ⁺	846.8	2 ⁺
1810.8	98	2657.6	2 ⁺	846.8	2 ⁺	3036.9		5122.0		2085.1	4 ⁺
1852.4	50 2	4510.0	3 ⁻	2657.6	2 ⁺	3062.9	100	5148.0		2085.1	4 ⁺
1865.0		5985.0		4120.0	3 ⁺	3202.2	80	4049.0	3 ⁺	846.8	2 ⁺
1881.9	30 5	4539.5	1 ⁺ ,2 ⁺	2657.6	2 ⁺	3220.0		5305.0		2085.1	4 ⁺
1918.0	28	4878.0	2 ⁺	2960.0	2 ⁺	3253.7		4100.3	4 ⁺	846.8	2 ⁺
1963.9	19	4049.0	3 ⁺	2085.1	4 ⁺	3273.2		4120.0	3 ⁺	846.8	2 ⁺

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$^{56}\text{Fe}(\text{n},\text{n}'\gamma)$ 1974La23,1974La07,1983Ko39 (continued) $\gamma(^{56}\text{Fe})$ (continued)

E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π
3370.2	13	3370.2	2^+	0.0	0^+	3813.2	33 10	4660.0	$2^+, 3^+, 4^+$	846.8	2^+
3449.3	50 6	3449.3	$1^{(+)}$	0.0	0^+	3832.0	11 1	3832.0	2^+	0.0	0^+
3451.4	25	4298.2	4^+	846.8	2^+	3883.1	100	4729.9	$0^+, 2^+$	846.8	2^+
3455.0	100	4302.0	0^+	846.8	2^+	4007.2		6092.3	(3^-)	2085.1	4^+
3548.0	90	4395.0	3^+	846.8	2^+	4031.2	48	4878.0	2^+	846.8	2^+
3554.2	78 2	4401.0	2^+	846.8	2^+	4384.2	100	5231.0		846.8	2^+
3601.9	65 10	3601.9	2^+	0.0	0^+	4539.5	13 3	4539.5	$1^+, 2^+$	0.0	0^+
3663.2	31 2	4510.0	3^-	846.8	2^+	4948.2	100	5795.0		846.8	2^+
3765.5	47 10	4612.3		846.8	2^+						

† % photon branching from each level, from 1974La07. The authors quoted average value from $^{56}\text{Fe}(\text{n},\text{n}'\gamma)$ and $^{56}\text{Fe}(\text{p},\text{p}'\gamma)$ measurements.

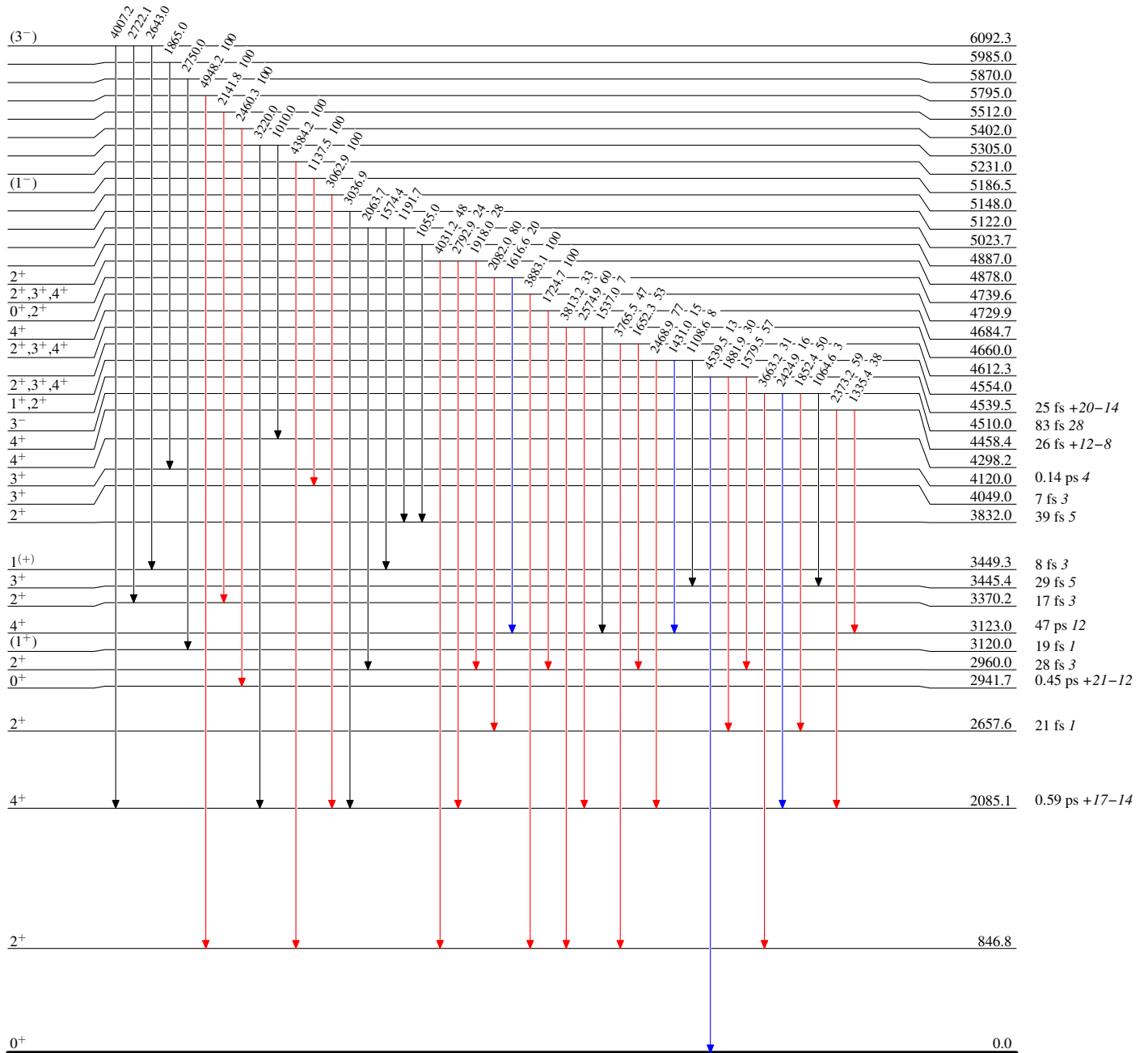
$^{56}\text{Fe}(n,n'\gamma)$ 1974La23,1974La07,1983Ko39

Level Scheme

Intensities: Type not specified

Legend

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$



$^{56}\text{Fe}(n,n'\gamma)$ 1974La23,1974La07,1983Ko39

Level Scheme (continued)

Intensities: Type not specified

Legend

- $\longrightarrow$ $I_\gamma < 2\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma < 10\% \times I_\gamma^{\max}$
 $\longrightarrow$ $I_\gamma > 10\% \times I_\gamma^{\max}$

