

$^{54}\text{Fe}(^3\text{He},d\gamma)$  1978Sc07,1976Ne04,1972Sh04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Huo Junde	NDS 109, 787 (2008)	30-Apr-2007

Others: 1976Ne01, 1976Lo09, 1975Ca36.

1978Sc07: E=18 MeV; enriched (96%) self-supporting targets; Ge(Li); d- $\gamma$  coincidence near 0°.

1976Ne01: E=12-13 MeV; silicon  $\Delta E$ -E telescope; d- $\gamma$  coincidence; measured excitation energies, relative  $\gamma$ -ray intensities, and DSA;

1976Ne04: E=12 MeV; enriched (97%) targets; Ge(Li); measured  $\sigma(\theta)$  and DSA.

1976Lo09: E=5-6 MeV; enriched targets (self-supporting); tof method; large liquid scintillator for neutrons, Ge(Li) for  $\gamma$ ; n $\gamma$ -coin; measured  $\sigma(E; ED)$ .

1975Ca36: E=11 MeV; enriched (95%) self-supporting target (1 mg/cm<sup>2</sup>), thick silicon surface-barrier detectors, and Ge(Li); the Doppler shifted  $\gamma$ -ray spectra were taken in d $\gamma$ -coin.

1972Sh04: E=18 MeV; enriched self-supporting (1 mg/cm<sup>2</sup>) target, Ge(Li) and particle-telescope; measured  $\sigma(ED, E\gamma)$ , shell-model analyses.

 $^{55}\text{Co}$  Levels

T: from 1972Sh04, except as noted.

E(level) <sup>†</sup>	J $\pi$ <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	Comments
0.0	7/2 <sup>-</sup>		
2165.80 22	3/2 <sup>-</sup>	98 fs 13	T=1/2 T <sub>1/2</sub> : others: 87 fs 17 (1976Ne01), 98 fs 15 (1975Ca36).
2565.87 21	3/2 <sup>-</sup>	0.43 ps +8-6	T=1/2 T <sub>1/2</sub> : from 1975Ca36. Others: 0.73 ps 21 (1976Ne01), 0.48 ps 14 (1976Ne04).
2660.3 6	5/2 <sup>-</sup>		T=1/2 J $\pi$ : J=(3/2 <sup>-</sup> ) in 1972Sh04. E(level): observed by 1976Ne01.
2920.4 5			
2923.1 4		>0.17 ps	
2939.21 23	1/2 <sup>-</sup>	132 fs 45	T=1/2 T <sub>1/2</sub> : others:>208 fs (1976Ne01),>409 fs (1975Ca36). E(level): observed by 1975Ca36.
2977.0 8			T <sub>1/2</sub> : 35 fs +14-10 in 1976Ne01.
3303.3 4	5/2 <sup>-</sup>	70 fs 16	T=1/2
3323.1 4	1/2 <sup>-</sup>	38 fs 11	T=1/2
3335 @ 20	(5/2) <sup>-</sup>		T=1/2 J $\pi$ : J=5/2 <sup>-</sup> in 1972Sh04.
3642.5 3	3/2 <sup>-</sup>	0.21 ps +11-7	T <sub>1/2</sub> : from 1976Ne01. 0.48 ps +28-21 in 1976Ne04.
3726.3 10			
3866.1 @ 10			T=1/2 J $\pi$ : J=(5/2 <sup>-</sup> ) in 1972Sh04.
3870.9 @ 8			
3932.9 @ 8	(3/2) <sup>-</sup>		T=1/2
3942.9 7		>0.12 ps	
4164.6 11	1/2 <sup>-</sup> ,3/2	35 fs +7-3	T=1/2 J $\pi$ : J=(3/2 <sup>-</sup> ) in 1972Sh04. T <sub>1/2</sub> : from 1975Ca36. Others: 21 ps +10-7 (1976Ne01), 35 fs +7-3 (1976Ne04).
4176.8 10	5/2 <sup>-</sup>	<7 fs	T=1/2 T <sub>1/2</sub> : from 1976Ne01. Other:<7 fs (1976Ne04).
4628.7 11			
4712.5 8	3/2 <sup>-</sup>	0.21 ps +14-10	E(level),T <sub>1/2</sub> : from 1976Ne01.
4722.2 6	3/2 <sup>-</sup>	<21 fs	T=3/2 E(level): analog state of 3/2 <sup>-</sup> g.s. in $^{55}\text{Fe}$ . T <sub>1/2</sub> : from 1976Ne01. Other:<23 fs (1976Ne04).

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$^{54}\text{Fe}(^3\text{He,d}\gamma)$  **1978Sc07,1976Ne04,1972Sh04 (continued)** $^{55}\text{Co}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	Comments
4747.7 5	3/2 <sup>-</sup>	26 fs +23-19	T=3/2 (1976Lo09) E(level): analog state of 3/2 <sup>-</sup> g.s. in $^{55}\text{Fe}$ . T <sub>1/2</sub> : other:<21 fs (1976Ne01).
5172.2 11	1/2 <sup>-</sup>	7 fs +7-4	T=3/2 (1976Lo09) E(level): identified as analog state of 1/2 <sup>-</sup> 411 state in $^{55}\text{Fe}$ . T <sub>1/2</sub> : from 1976Ne01. Other:<28 fs (1976Ne04).
5242 5			
5541.9 21			J <sup>π</sup> : J=(3/2) <sup>-</sup> in 1972Sh04.
5725& 20	5/2 <sup>-</sup>		T=3/2
5752& 15			

<sup>†</sup> From 1976Ne04 (when E(level)<4160 keV) and 1978Sc07 (when E(level)>4160 keV), except as noted.

<sup>‡</sup> From Adopted Levels.

<sup>#</sup> From 1976Ne04, except as noted.

@ Observed by 1972Sh04 only.

& From 1972Sh04.

 $\gamma(^{55}\text{Co})$ 

E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>‡</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>#</sup>	Comments
357.2 5		2923.1		2565.87	3/2 <sup>-</sup>		
373.5 5	25 2	2939.21	1/2 <sup>-</sup>	2565.87	3/2 <sup>-</sup>	M1	
411		2977.0		2565.87	3/2 <sup>-</sup>		E <sub>γ</sub> : observed by 1975Ca36.
662.4 10		3323.1	1/2 <sup>-</sup>	2660.3	5/2 <sup>-</sup>		E <sub>γ</sub> : observed only by 1972Sh04 (I <sub>γ</sub> =5%).
703.3 6		3642.5	3/2 <sup>-</sup>	2939.21	1/2 <sup>-</sup>		
737.4 5	16@ 4	3303.3	5/2 <sup>-</sup>	2565.87	3/2 <sup>-</sup>	M1	
754.5 4		2920.4		2165.80	3/2 <sup>-</sup>		E <sub>γ</sub> : observed by 1976Ne01.
757.3 5		2923.1		2165.80	3/2 <sup>-</sup>		
757.3 5	23 5	3323.1	1/2 <sup>-</sup>	2565.87	3/2 <sup>-</sup>	M1	
773.4 5	70 2	2939.21	1/2 <sup>-</sup>	2165.80	3/2 <sup>-</sup>	M1	
804.5 10	10 2	4747.7	3/2 <sup>-</sup>	3942.9			
1007.4 20	9 2	5172.2	1/2 <sup>-</sup>	4164.6	1/2 <sup>-</sup> ,3/2		
1021.5 10	12 2	4747.7	3/2 <sup>-</sup>	3726.3			
1076.6 6		3642.5	3/2 <sup>-</sup>	2565.87	3/2 <sup>-</sup>		
1157.4 5	77 5	3323.1	1/2 <sup>-</sup>	2165.80	3/2 <sup>-</sup>	M1	
1229.4 20	17 2	5172.2	1/2 <sup>-</sup>	3942.9			
1305	48&	3870.9		2565.87	3/2 <sup>-</sup>		
1367	79&	3932.9	(3/2 <sup>-</sup> )	2565.87	3/2 <sup>-</sup>		
1376.9 8		3942.9		2565.87	3/2 <sup>-</sup>		
1399 1	6 1	4722.2	3/2 <sup>-</sup>	3323.1	1/2 <sup>-</sup>		
1419 1	19 2	4722.2	3/2 <sup>-</sup>	3303.3	5/2 <sup>-</sup>		
1476.7 6		3642.5	3/2 <sup>-</sup>	2165.80	3/2 <sup>-</sup>	M1	
1588& 20		5752		4164.6	1/2 <sup>-</sup> ,3/2		
1598.6 11	100	4164.6	1/2 <sup>-</sup> ,3/2	2565.87	3/2 <sup>-</sup>	M1	
1705	52&	3870.9		2165.80	3/2 <sup>-</sup>		
1767	21&	3932.9	(3/2 <sup>-</sup> )	2165.80	3/2 <sup>-</sup>		
1773.5	66 6	4712.5	3/2 <sup>-</sup>	2939.21	1/2 <sup>-</sup>	M1	
1783 1	15 2	4722.2	3/2 <sup>-</sup>	2939.21	1/2 <sup>-</sup>		
1808.5 10	15 2	4747.7	3/2 <sup>-</sup>	2939.21	1/2 <sup>-</sup>		

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$^{54}\text{Fe}(^3\text{He,d}\gamma)$  **1978Sc07,1976Ne04,1972Sh04 (continued)** $\gamma(^{55}\text{Co})$  (continued)

$E_\gamma$ †	$I_\gamma$ ‡	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. #	Comments
1826.5 10	10 2	4747.7	3/2 <sup>-</sup>	2920.4			
2051.9	34 6	4712.5	3/2 <sup>-</sup>	2660.3	5/2 <sup>-</sup>	M1	
2088.5 10	21 3	4747.7	3/2 <sup>-</sup>	2660.3	5/2 <sup>-</sup>		
2156 1	60 5	4722.2	3/2 <sup>-</sup>	2565.87	3/2 <sup>-</sup>		
2165.7 3	100	2165.80	3/2 <sup>-</sup>	0.0	7/2 <sup>-</sup>	E2	
2181.5 10	14 2	4747.7	3/2 <sup>-</sup>	2565.87	3/2 <sup>-</sup>		
2402 & 20		5725	5/2 <sup>-</sup>	3323.1	1/2 <sup>-</sup>		
2462.8 10	≤100	4628.7		2165.80	3/2 <sup>-</sup>		
2565.8 3	100	2565.87	3/2 <sup>-</sup>	0.0	7/2 <sup>-</sup>	E2	
2581.5 10	18 3	4747.7	3/2 <sup>-</sup>	2165.80	3/2 <sup>-</sup>		
2606.4 20	49 5	5172.2	1/2 <sup>-</sup>	2565.87	3/2 <sup>-</sup>	M1,E2	
2660.7 9	100	2660.3	5/2 <sup>-</sup>	0.0	7/2 <sup>-</sup>		
2828 & 20		5752		2923.1			
2939.1 3	5 2	2939.21	1/2 <sup>-</sup>	0.0	7/2 <sup>-</sup>		
2977		2977.0		0.0	7/2 <sup>-</sup>		$E_\gamma$ : observed by <a href="#">1975Ca36</a> .
3006.4 20	25 3	5172.2	1/2 <sup>-</sup>	2165.80	3/2 <sup>-</sup>	M1,E2	
3303.2 4	84 @ 4	3303.3	5/2 <sup>-</sup>	0.0	7/2 <sup>-</sup>	M1,E2	
3335 20	100	3335	(5/2) <sup>-</sup>	0.0	7/2 <sup>-</sup>		$E_\gamma$ : observed only by <a href="#">1972Sh04</a> .
3376 2	100	5541.9		2165.80	3/2 <sup>-</sup>		
3642.4 5		3642.5	3/2 <sup>-</sup>	0.0	7/2 <sup>-</sup>		
3726.6 19		3726.3		0.0	7/2 <sup>-</sup>		
3866	100	3866.1		0.0	7/2 <sup>-</sup>		
4176.6 10	100	4176.8	5/2 <sup>-</sup>	0.0	7/2 <sup>-</sup>	M1	
5242 5	100	5242		0.0	7/2 <sup>-</sup>		

† From [1976Ne04](#) (when  $E(\text{level}) < 4160$  keV) and [1978Sc07](#) (when  $E(\text{level}) > 4160$  keV), except as noted.

‡ Percent branching ratio. Values from [1976Ne01](#), [1975Ca36](#), and [1978Sc07](#), except as noted.

# From [1976Ne01](#) based on transition strengths.

@ From [1977Er02](#).

& From [1972Sh04](#).

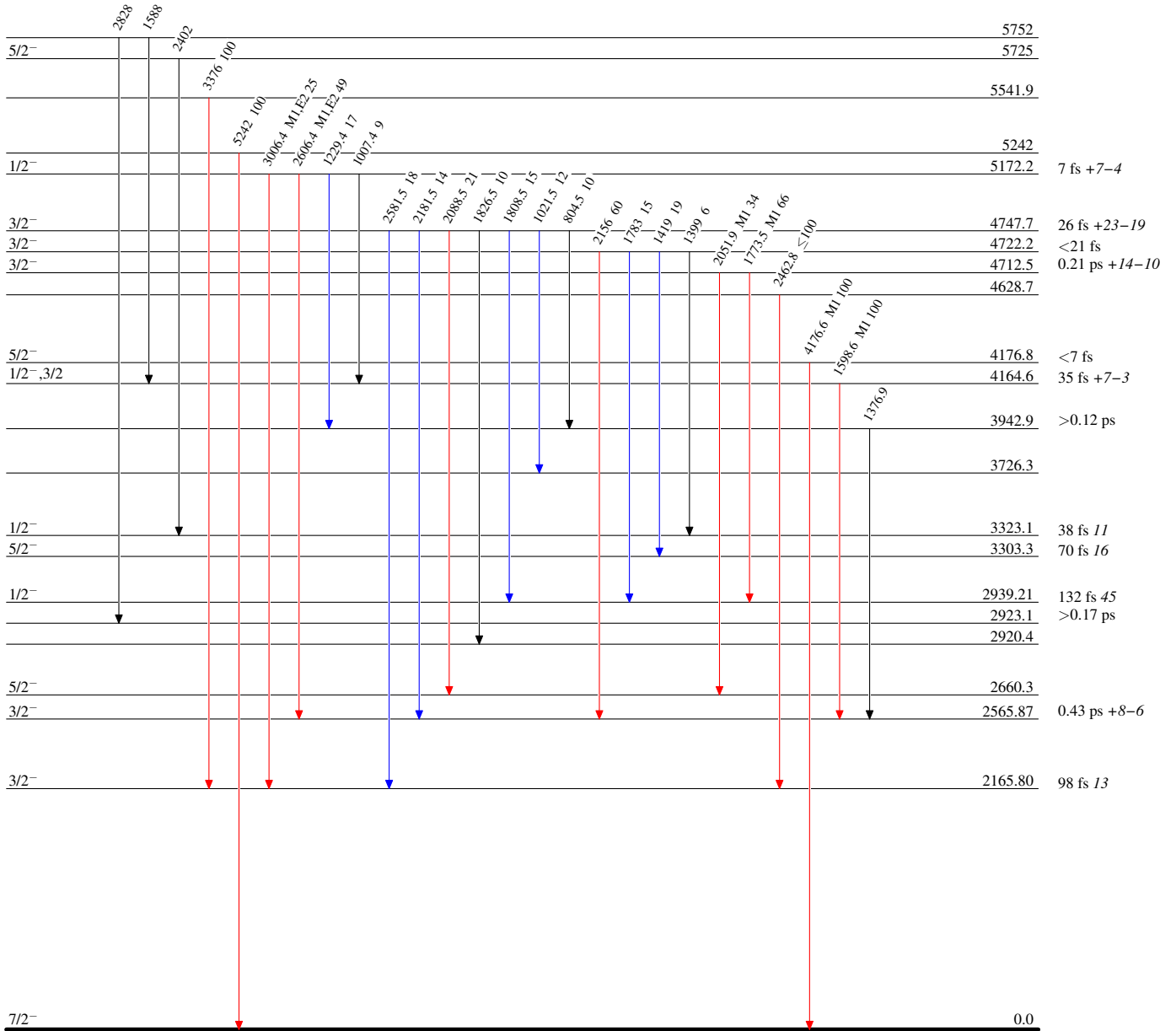
$^{54}\text{Fe}(\text{}^3\text{He,d}\gamma)$  1978Sc07,1976Ne04,1972Sh04

Level Scheme

Intensities: Relative  $I_\gamma$

Legend

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



$^{55}_{27}\text{Co}_{28}$

$^{54}\text{Fe}(\text{}^3\text{He},\text{}^d\gamma)$  1978Sc07,1976Ne04,1972Sh04

## Level Scheme (continued)

Intensities: Relative  $I_\gamma$ 

## Legend

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

