

$^{56}\text{Fe}(\mu^-, \nu n \gamma)$ 2006Me08

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

Included $\text{Fe}(\mu^-, \text{pxn}\gamma)$ from 1973Ev02.

2006Me08: The μ^- beam obtained from decay of π^- beam at 90 MeV/c. Measured I_γ , $\gamma\gamma$, γ -p using two HPGe detectors at TRIUMF facility.

1973Ev02: $\text{Fe}(\mu^-, \text{pxn}\gamma)$, measured E_γ , I_γ .

Muonic Lyman series for natural Iron

μ x ray	Energy	Intensity in percent
2p-1s	1253.06 6	a 74.5 15
2p-1s	1257.19 5	a
3p-1s	1522.3 3	7.5 4
4p-1s	1615.3 3	2.7 2
5p-1s	1658.2 3	1.6 2
6p-1s	1681.7 3	2.2 2
7p-1s	1695.7 3	2.0 2
8p-1s	1704.7 3	1.2 2
(9- ∞)p-1s	1708-1733	8.4 10

a: Taken by 2006Me08 from 1976Ha24, used as calibration standard.

Muonic Balmer series for natural Iron

μ x ray	Energy	Intensity in percent
3d-2p	265.3 3	28.8
3d-2p	268.9 3	16.6
4d-2p	358.0 3	5.4
4d-2p	362.0 3	3.1
5d-2p	400.6 3	5.9
5d-2p	404.6 3	
6d-2p	423.8 3	3.4
6d-2p	427.8 3	
7d-2p	437.8 3	3.5
7d-2p	442.5 3	
8d-2p	447.3 3	1.5
8d-2p	451.5 3	
(9- ∞)d-2p	455-475	5.9

 ^{55}Mn Levels

E(level)	J^π	Percent Yield of level ‡	Comments
0.0	$5/2^-$		
125.95	$7/2^-$		
984.26	$9/2^-$	1.0 6	cascading=1.5% 3.
1289.1	$(11/2^+)$	<0.4	
1292.12	$(11/2)^-$	<0.3	cascading=0.9% 2, 2006Me08 list -0.1 4.
1293.0	$(1/2^-)$	0.6 6	
1528.36	$3/2^-$	4.3 14	cascading=5.3% 7.
1884.08	$(7/2)^-$	0.9 9	cascading=1.2% 4.

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$^{56}\text{Fe}(\mu^-, \nu n\gamma)$ **2006Me08** (continued) ^{55}Mn Levels (continued)

E(level)	J^π †	Percent Yield of level‡	Comments
2015.2	7/2 ⁻	<0.3	
2198.43	7/2 ⁻	1.6 8	
2215.0	5/2 ⁻ , 7/2 ⁻	0.6 6	
2252.45	3/2 ⁻	2.5 9	
2266.89	(5/2) ⁻	1.2 10	cascading=1.5% 4.
2311.45	13/2 ⁻	<0.3	
2365.80	5/2 ⁻	1.5 7	
2398.41	(1/2 to 9/2) ⁻	0.4 4	
2426.53	1/2 ⁺	2.8 4	
2563.15	3/2 ⁻	2.7 9	
2727.31	7/2 ⁻	3.6 11	cascading=0.8% 8.
2752.69	5/2 ⁻ , 9/2 ⁻	3.6 11	
2873.28	1/2 ⁻	1.7 3	
2976.15	3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻	2.9 12	
3037.5	1/2 ⁻ , 3/2 ⁻	1.5 4	
3039.9	3/2 ⁺ , 5/2 ⁺	0.9 7	
3424.1	(3/2) ⁺	1.3 13	
3610.8		<0.6	

† From ^{55}Mn adopted values.

‡ Corrected for known cascading determined in this experiments.

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

E_γ †	Percent γ -ray yield	E_i (level)	J_i^π	E_f	J_f^π	Comments
(126)		125.95	7/2 ⁻	0.0	5/2 ⁻	E_γ : from 1973Ev02.
304.2	<0.4	1289.1	(11/2 ⁺)	984.26	9/2 ⁻	
308.1		1292.12	(11/2) ⁻	984.26	9/2 ⁻	Percent γ -ray yield: intensity not listed by 2006Me08, the peak is overlapped by other transitions.
697.7	0.7 7	3424.1	(3/2) ⁺	2727.31	7/2 ⁻	
739.2	0.8 3	2266.89	(5/2) ⁻	1528.36	3/2 ⁻	
770.6	1.4 4	3037.5	1/2 ⁻ , 3/2 ⁻	2266.89	(5/2) ⁻	
858.2	2.2 4	984.26	9/2 ⁻	125.95	7/2 ⁻	
868.6	0.8 4	2752.69	5/2 ⁻ , 9/2 ⁻	1884.08	(7/2) ⁻	
898.2	2.6 4	2426.53	1/2 ⁺	1528.36	3/2 ⁻	
1019.42	<0.25	2311.45	13/2 ⁻	1292.12	(11/2) ⁻	
1030.2	<0.39	2015.2	7/2 ⁻	984.26	9/2 ⁻	
1166.3	0.5 2	1292.12	(11/2) ⁻	125.95	7/2 ⁻	
1213.9	0.5 3	2198.43	7/2 ⁻	984.26	9/2 ⁻	
1293.2	0.5 5	1293.0	(1/2) ⁻	0.0	5/2 ⁻	
1344.8	1.1 3	2873.28	1/2 ⁻	1528.36	3/2 ⁻	
1435.5		2727.31	7/2 ⁻	1292.12	(11/2) ⁻	Percent γ -ray yield: intensity not listed by 2006Me08, the peak is overlapped by other transitions.
1447.3	0.4 4	2976.15	3/2 ⁻ , 5/2 ⁻ , 7/2 ⁻	1528.36	3/2 ⁻	
1528.3	8.8 12	1528.36	3/2 ⁻	0.0	5/2 ⁻	
1743.0	<0.7	2727.31	7/2 ⁻	984.26	9/2 ⁻	
1758.1	0.8 5	1884.08	(7/2) ⁻	125.95	7/2 ⁻	
1884.0	1.0 7	1884.08	(7/2) ⁻	0.0	5/2 ⁻	
2198.5	0.8 8	2198.43	7/2 ⁻	0.0	5/2 ⁻	
2215.1	0.5 5	2215.0	5/2 ⁻ , 7/2 ⁻	0.0	5/2 ⁻	

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$^{56}\text{Fe}(\mu^-, \nu n \gamma)$ **2006Me08 (continued)** $\gamma(^{55}\text{Mn})$ (continued)

E_γ^\dagger	Percent γ -ray yield	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
2239.8	1.0 5	2365.80	$5/2^-$	125.95	$7/2^-$	
2252.4	2.3 8	2252.45	$3/2^-$	0.0	$5/2^-$	
2268.0	1.5 8	2266.89	$(5/2)^-$	0.0	$5/2^-$	E_γ : level energy difference=2266.89.
2273.1	0.3 3	2398.41	$(1/2 \text{ to } 9/2)^-$	125.95	$7/2^-$	
2563.0	2.5 8	2563.15	$3/2^-$	0.0	$5/2^-$	
2626.7	1.3 6	2752.69	$5/2^-, 9/2^-$	125.95	$7/2^-$	
2727.2	2.1 4	2727.31	$7/2^-$	0.0	$5/2^-$	
2752.8	1.1 5	2752.69	$5/2^-, 9/2^-$	0.0	$5/2^-$	
2873.2	0.9 9	2873.28	$1/2^-$	0.0	$5/2^-$	
2914.1	0.8 6	3039.9	$3/2^+, 5/2^+$	125.95	$7/2^-$	
2976.1	2.2 9	2976.15	$3/2^-, 5/2^-, 7/2^-$	0.0	$5/2^-$	
3297.9	0.5 5	3424.1	$(3/2)^+$	125.95	$7/2^-$	
3484.9	<0.5	3610.8		125.95	$7/2^-$	

† **2006Me08** list values from ^{55}Mn adopted values.

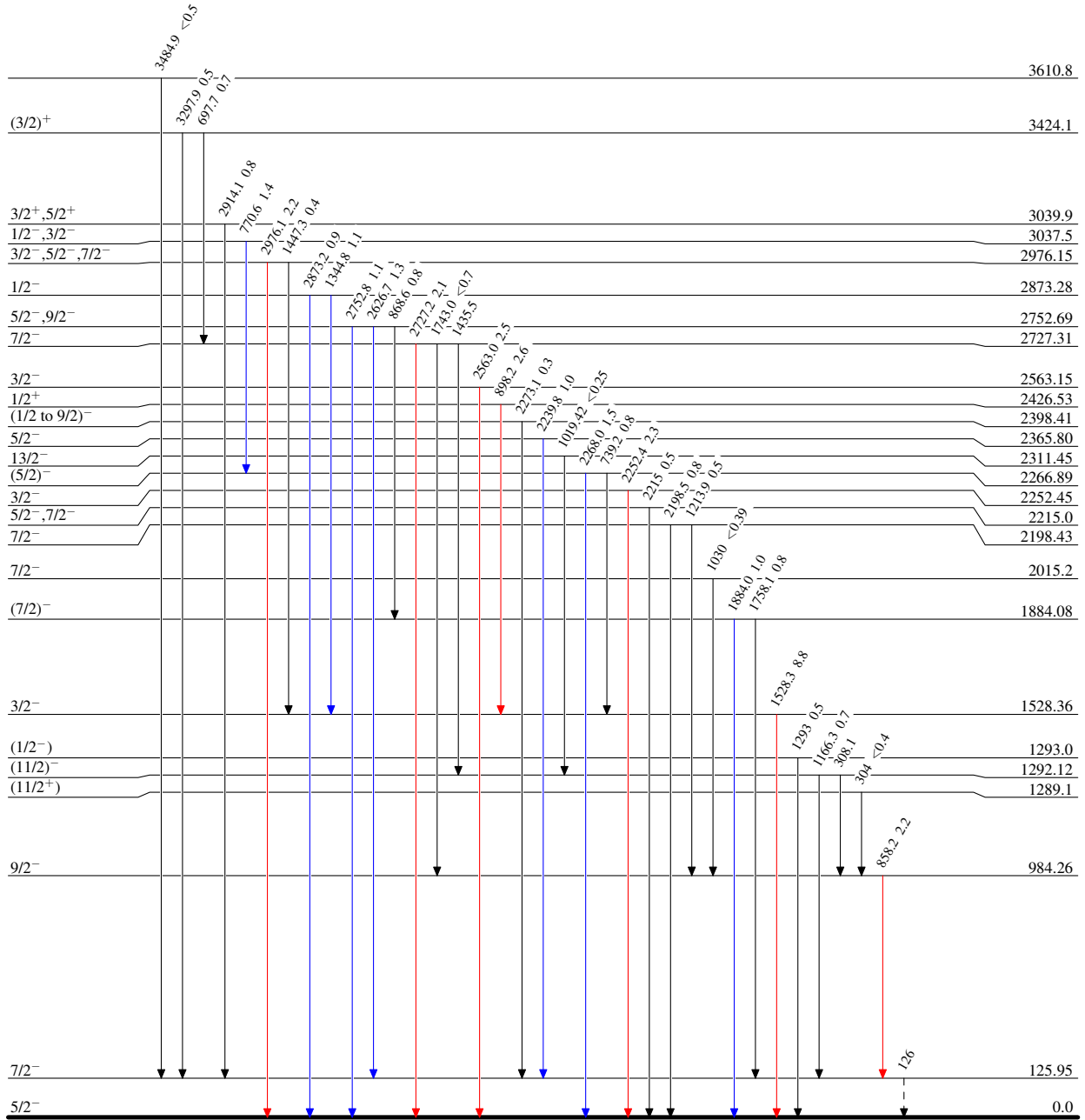
⁵⁶Fe(μ⁻,νnγ) 2006Me08

Legend

Level Scheme

Intensities: Percent γ-ray yield per muon capture

- I_γ < 2% × I_γ^{max}
- I_γ < 10% × I_γ^{max}
- I_γ > 10% × I_γ^{max}
- - - - - γ Decay (Uncertain)



⁵⁵Mn₃₀