

${}^{62}\text{Mn}$   $\beta^-$  decay (671 ms) 2010Ho13,1983Ru06

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Alan L. Nichols, Balraj Singh, Jagdish K. Tuli		NDS 113, 973 (2012)	15-Apr-2012

Parent:  ${}^{62}\text{Mn}$ :  $E=0+y$ ;  $J^\pi=(4^+)$ ;  $T_{1/2}=671$  ms 5;  $Q(\beta^-)=10697.1$  38;  $\% \beta^-$  decay=100.0

${}^{62}\text{Mn}$ -E, $T_{1/2}$ , $J^\pi$ : From Adopted Levels.

${}^{62}\text{Mn}$ - $Q(\beta^-)$ : From 2011AuZZ. 2003Au03 list 10860 220.

2010Ho13:  ${}^{62}\text{Mn}$  formed in  ${}^{238}\text{U}({}^{64}\text{Ni},\text{X})$  reaction at  $E=430$  MeV beam provided by ATLAS facility at Argonne. Target= 55 mg/cm<sup>2</sup>. Measured  $E_\gamma$ ,  $I_\gamma$ ,  $\gamma\gamma$ ,  $\gamma\gamma(\theta)$  using GAMMASPHERE array of 100 Compton-suppressed HPGe detectors. Comparisons made with shell-model calculations using  $pf$  and  $pf_g$  basis space. Comparison with level structures of  ${}^{54}\text{Fe}$ ,  ${}^{56}\text{Fe}$ ,  ${}^{58}\text{Fe}$ ,  ${}^{60}\text{Fe}$ , and  ${}^{64}\text{Fe}$ .

1983Ru06:  ${}^{62}\text{Mn}$  produced in the reaction:  $\text{W}({}^{76}\text{Ge},\text{X})$  at  $E=9$  MeV/nucleon.  $E_\gamma$ ,  $I_\gamma$ ,  $\beta\gamma$ - and  $\gamma\gamma$ -coin. measurements were made; only one activity with half-life of 880 ms 150 reported with proposed  $J^\pi=3^+$ .

Data are from 2010Ho13, unless otherwise stated.

There is no evidence of any contribution from  $(1^+)$ , 92-ms activity in the data presented by 2010Ho13, thus the evaluators assume that that only the 671-ms isomer contributes to this decay scheme.

Total decay energy of 11666 keV 362 deduced (by RADLIST code) from proposed decay scheme is in agreement with the expected value of 10697 keV 4, indicating that decay scheme is fairly complete.

 ${}^{62}\text{Fe}$  Levels

E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	Comments
0.0	$0^+$	
877.31 10	$2^+$	
2016.98 18	$(2^+)$	
2176.47 14	$(4^+)$	
2691.62 16	$(3^+)$	
2849.72 24		
3008.9 5	$(4^-)$	
3015.7 5	$(5^-)$	
3310.0 7	$(6^-)$	
3360.3 15		
3633.48 18	$(4^+)$	$J^\pi: (2^+)$ proposed in 1983Ru06.
3661.7 15		
3713.7 15		
4050.7 4	$(2^+,3,4^+)$	

<sup>†</sup> From least-squares fit to  $E_\gamma$  data.

<sup>‡</sup> From Adopted Levels.

 $\beta^-$  radiations

E(decay)	E(level)	$I\beta^-$ <sup>†#</sup>	$\text{Log } f_t$ <sup>‡</sup>	Comments
(6646 4)	4050.7	5.1 11	>5.7	av $E\beta=3060.1$ 19
(6983 4)	3713.7	1.2 6	>6.4	av $E\beta=3224.7$ 20
(7035 4)	3661.7	0.9 4	>6.5	av $E\beta=3250.1$ 20
(7064 4)	3633.48	46.0 24	>4.8	av $E\beta=3263.9$ 19
(7337 4)	3360.3	1.2 6	>6.5	av $E\beta=3397.4$ 20
(7387 4)	3310.0	0.7 3	>6.7	av $E\beta=3422.0$ 19
(7681 4)	3015.7	0.9 6	>6.7	av $E\beta=3565.8$ 19
(7688 4)	3008.9	1.3 5	>6.5	av $E\beta=3569.1$ 19
(8005 4)	2691.62	17 3	>5.5	av $E\beta=3724.2$ 19

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$^{62}\text{Mn}$   $\beta^-$  decay (671 ms) **2010Ho13,1983Ru06** (continued)

$\beta^-$  radiations (continued)

E(decay)	E(level)	$I\beta^{-\dagger\#}$	Log $ft^{\ddagger}$	Comments
(8521 4)	2176.47	8.4 19	>5.9	av $E\beta=3976.0$ 19
(8680 4)	2016.98	27 4	>5.5	av $E\beta=4053.9$ 19

$\dagger$  Deduced by the evaluators from intensity balance at each level, and should be treated as approximate values since there may be missing gamma transitions from possible levels above 4.1 MeV. Note that there is (non-physical) negative  $\beta$  feeding of -11 4 to the 877.3 level.

$\ddagger$  Values are considered as tentative since there may be some missing  $\gamma$  transitions from possible levels above 4.1 MeV. No  $J^\pi$  assignments are made based on these log  $ft$  values.

$\#$  Absolute intensity per 100 decays.

$\gamma(^{62}\text{Fe})$

I $\gamma$  normalization: From I $\gamma$ (877.3)+I $\gamma$ (2017.0 $\gamma$ )=100.

$E_\gamma^\dagger$	I $\gamma^{\ddagger\#}$	$E_i$ (level)	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. $^{\ddagger}$	Comments
294.3 5	0.6 3	3310.0	(6 $^-$ )	3015.7	(5 $^-$ )		Mult.: (M1) in <a href="#">2010Ho13</a> .
301.0 10	<0.2	3310.0	(6 $^-$ )	3008.9	(4 $^-$ )		Mult.: (E2) in <a href="#">2010Ho13</a> .
515.2 2	1.6 4	2691.62	(3 $^+$ )	2176.47	(4 $^+$ )		Mult.: (M1) in <a href="#">2010Ho13</a> .
673.3 2	4.4 8	2849.72		2176.47	(4 $^+$ )		
674.8 2	5.4 8	2691.62	(3 $^+$ )	2016.98	(2 $^+$ )		Mult.: (M1) in <a href="#">2010Ho13</a> .
832.4 5	1.5 5	3008.9	(4 $^-$ )	2176.47	(4 $^+$ )		Mult.: (E1) in <a href="#">2010Ho13</a> .
839.3 5	1.5 5	3015.7	(5 $^-$ )	2176.47	(4 $^+$ )		Mult.: (E1) in <a href="#">2010Ho13</a> .
877.3 1	100	877.31	2 $^+$	0.0	0 $^+$	E2	Mult.: from Adopted Gammas. $E_\gamma=876.8$ 3, I $\gamma=100$ 10 ( <a href="#">1983Ru06</a> ).
941.8 2	21.1 15	3633.48	(4 $^+$ )	2691.62	(3 $^+$ )	(D)	Mult.: $\gamma\gamma\gamma(\theta)$ consistent with 4 -> 3 -> 2 -> 0, D-D-Q cascade; M1 in <a href="#">2010Ho13</a> . (942 $\gamma$ )[1814 $\gamma$ ](877 $\gamma$ )( $\theta$ ): $A_2=+0.23$ 7, $A_4=0.00$ 11. Mult.: (M1) in <a href="#">2010Ho13</a> . $E_\gamma=942.1$ 4, I $\gamma=29$ 8 ( <a href="#">1983Ru06</a> ) placed from 1820 to 877 level; former level is no longer included in the present level scheme.
1139.8 2	35 3	2016.98	(2 $^+$ )	877.31	2 $^+$		Mult.: (M1) in <a href="#">2010Ho13</a> .
1183.8 15	1.3 6	3360.3		2176.47	(4 $^+$ )		
1201.1 3	3.8 8	4050.7	(2 $^+$ ,3,4 $^+$ )	2849.72			
1299.2 1	38.0	2176.47	(4 $^+$ )	877.31	2 $^+$	Q	Mult.: $\gamma\gamma(\theta)$ consistent with 4 -> 2 -> 0, Q-Q cascade; E2 in <a href="#">2010Ho13</a> . $E_\gamma=1299.0$ 4, I $\gamma=28$ 9 ( <a href="#">1983Ru06</a> ). (1299 $\gamma$ )(877 $\gamma$ )( $\theta$ ): $A_2=+0.06$ 7, $A_4=+0.10$ 10. Mult.: (M1) in <a href="#">2010Ho13</a> . $E_\gamma=1457.4$ 5, I $\gamma=16$ 7 ( <a href="#">1983Ru06</a> ).
1457.1 2	16.3 12	3633.48	(4 $^+$ )	2176.47	(4 $^+$ )		
1485.2 15	0.9 4	3661.7		2176.47	(4 $^+$ )		
1537.2 15	1.2 6	3713.7		2176.47	(4 $^+$ )		
1616.4 3	5.5 9	3633.48	(4 $^+$ )	2016.98	(2 $^+$ )		Mult.: (E2) in <a href="#">2010Ho13</a> .
1814.0 2	31.9 25	2691.62	(3 $^+$ )	877.31	2 $^+$	D	Mult.: $\gamma\gamma(\theta)$ consistent with 3 -> 2 -> 0, D-Q cascade; M1 in <a href="#">2010Ho13</a> . (1814 $\gamma$ )(877 $\gamma$ )( $\theta$ ): $A_2=-0.38$ 9, $A_4=-0.14$ 12. $E_\gamma=1815.0$ 6, I $\gamma=23$ 8 ( <a href="#">1983Ru06</a> ) placed from 3634 to 1820 level; latter level is no longer included in the present level scheme.
1874.0 15	0.5 5	4050.7	(2 $^+$ ,3,4 $^+$ )	2176.47	(4 $^+$ )		

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${}^{62}\text{Mn}$   $\beta^-$  decay (671 ms) 2010Ho13,1983Ru06 (continued) $\gamma({}^{62}\text{Fe})$  (continued)

$E_\gamma$ <sup>†</sup>	$I_\gamma$ <sup>†#</sup>	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
2017.0 10	4.0 20	2016.98	(2 <sup>+</sup> )	0.0	0 <sup>+</sup>	Mult.: (E2) in 2010Ho13. E $\gamma$ =2016.0 8, I $\gamma$ =11 6 (1983Ru06).
2756.0 5	5.3 7	3633.48	(4 <sup>+</sup> )	877.31	2 <sup>+</sup>	Mult.: (E2) in 2010Ho13.
3172.3 9	1.0 5	4050.7	(2 <sup>+</sup> ,3,4 <sup>+</sup> )	877.31	2 <sup>+</sup>	

<sup>†</sup> From 2010Ho13.

<sup>‡</sup> From Adopted Gammas. Several multiplicities are assigned in 2010Ho13 which seem implied simply on initial and final  $J^\pi$  values.

# For absolute intensity per 100 decays, multiply by 0.96 2.

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## Decay Scheme

Intensities:  $I_{(\gamma+ce)}$  per 100 parent decays

Legend

