

¹⁸⁸Re IT decay (18.59 min) 1968Ma14,1964Ta07,1964Bu10

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev, S. Juutinen, D. J. Hartley		NDS 150, 1 (2018)	1-Feb-2018

Parent: ¹⁸⁸Re: E=171.98 10; J^π=6⁻; T_{1/2}=18.59 min 4; %IT decay=100.0

1968Ma14: Measured γ, γγ, γγ(t), with Ge(Li) detector, T_{1/2}. This is the only work that separates the 63-keV γ ray from the K X rays.

1964Ta07,1964Bu10: Measured γ, γγ, γγ(t), with NaI(Tl) detector.

Others: 1989Ab18, 1972De67, 1967Na05, 1965Hu02, 1963Sc05, 1962Ha46, 1953Mi08, 1953Fl07.

Relative I(L x ray)=1200 100 (1964Ta07); I(K x ray)=1100 (1968Ma14).

¹⁸⁸Re Levels

E(level) [†]	J ^π [‡]	T _{1/2}	Comments
0.0	1 ⁻		
63.583 3	2 ⁻	56 ps 7	T _{1/2} : from 63γ-105γ(Δt) (1968Ma14). Others: ≤1.2 ns (1965Hu02) and ≤20 ns (1964Ta07).
156.047 5	3 ⁻		
169.445 9	3 ⁻		
171.98 10	6 ⁻	18.59 min 4	T _{1/2} : from 1989Ab18. Others: 18.5 min 3 (1965Na01), 18.7 min 2 (1964Ta07), and 18.7 min 3 (1953Fl07).

[†] From a least-squares fit to Eγ.

[‡] From Adopted Levels.

γ(¹⁸⁸Re)

I_γ normalization: from I(γ+ce)(γ's to g.s.)=100.

E _γ [‡]	I _γ # [@]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [‡]	δ [‡]	α [†]	Comments
(2.636 3)	3.3×10 ⁻¹⁰ 11	171.98	6 ⁻	169.445	3 ⁻	(M3)		1.6×10 ¹² 5	%I _γ =3.8×10 ⁻¹¹ 6 α(M)=1.27×10 ¹² 42 α(N)=3.2×10 ¹¹ 11; α(O)=4.5×10 ¹⁰ 15; α(P)=2.78×10 ⁸ 87 Mult.: from ce(N) observed by 1964Ta07.
(13.3932 20)		169.445	3 ⁻	156.047	3 ⁻				
15.93 10	1.72×10 ⁻⁵ 11	171.98	6 ⁻	156.047	3 ⁻	M3		1.96×10 ⁷ 9	%I _γ =1.98×10 ⁻⁰⁶ 11 α(L)=1.38×10 ⁷ 7; α(M)=4.51×10 ⁶ 21 α(N)=1.12×10 ⁶ 5; α(O)=1.61×10 ⁵ 8; α(P)=1.98×10 ³ 9 E _γ : From the observed M-shell conversion electron line in 1964Ta07. Mult.: from observed ce(L3). ce(L1) and ce(L2) not detected. M1/M3≈0.2. Other M-conversion lines not found. Hence, M3 assignment (1964Ta07).

Continued on next page (footnotes at end of table)

^{188}Re IT decay (18.59 min) **1968Ma14,1964Ta07,1964Bu10** (continued) $\gamma(^{188}\text{Re})$ (continued)

E_γ ‡	I_γ #@	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	δ^\ddagger	α^\dagger	Comments
63.583 3	194 7	63.583	2 ⁻	0.0	1 ⁻	M1+E2	0.061 23	3.42 10	%I γ =22.3 5 $\alpha(\text{L})=2.64$ 8; $\alpha(\text{M})=0.606$ 18 $\alpha(\text{N})=0.147$ 5; $\alpha(\text{O})=0.0245$ 7; $\alpha(\text{P})=0.001742$ 25 E_γ : Others: 63.7 1 (1962Ha46), 63.58 (1968Ma14), and 63.581 3 (1963Sc05). I_γ : From intensity balance. Others: 21.4 22 (1968Ma14), 13 6 (1963Sc05); $I_\gamma(63.6\gamma)/I_\gamma(92.4\gamma)=4.0$ (1972De67). Mult.: $\alpha(\text{L})_{\text{exp}}=2.7$ 5 using L x ray fluorescence yield of 0.3 in 1964Ta07.
92.464 3	45.1 18	156.047	3 ⁻	63.583	2 ⁻	M1+E2	0.44 13	6.34 12	%I γ =5.2 3 $\alpha(\text{K})=4.6$ 4; $\alpha(\text{L})=1.30$ 23; $\alpha(\text{M})=0.31$ 6 $\alpha(\text{N})=0.075$ 14; $\alpha(\text{O})=0.0117$ 19; $\alpha(\text{P})=0.00051$ 5 E_γ : Others: 92.45 (1968Ma14), 92.8 6 (1964Bu10), and 92.447 6 (1963Sc05). I_γ : From $I_\gamma(105.8530\gamma)=100.0$ 18 and $I_\gamma(92.464\gamma)/I_\gamma(105.8530\gamma)=0.451$ 16, weighted average from the measured intensities of $I_\gamma(105.8530\gamma)=200$ 10 (1968Ma14), 200 20 (1964Ta07) and 226 5 (1963Sc05), and $I_\gamma(92.464\gamma)=100$ 5 (1968Ma14), 100 6 (1964Ta07) and 100 5 (1963Sc05). Mult.: $\alpha(\text{K})_{\text{exp}}=5.9$ 9, $\alpha(\text{L})_{\text{exp}}=0.9$ 2 (1964Ta07).
105.8530 3	100.0 18	169.445	3 ⁻	63.583	2 ⁻	M1+E2	0.44 19	4.21 15	%I γ =11.5 5 $\alpha(\text{K})=3.2$ 4; $\alpha(\text{L})=0.80$ 17; $\alpha(\text{M})=0.19$ 5 $\alpha(\text{N})=0.046$ 10; $\alpha(\text{O})=0.0072$ 14; $\alpha(\text{P})=0.00034$ 4 I_γ : From Adopted gammas. E_γ : Other: 105.9 3 (1964Bu10), 105.96 (1968Ma14), 105.960 8 (1963Sc05). Mult.: $\alpha(\text{K})_{\text{exp}}=3.8$ 5, $\alpha(\text{L})_{\text{exp}}=0.7$ 2 (1964Ta07).
156.050 6	3.3 4	156.047	3 ⁻	0.0	1 ⁻	[E2]		0.759	%I γ =0.38 5 $\alpha(\text{K})=0.322$ 5; $\alpha(\text{L})=0.330$ 5; $\alpha(\text{M})=0.0833$ 12 $\alpha(\text{N})=0.0198$ 3; $\alpha(\text{O})=0.00287$ 4; $\alpha(\text{P})=2.69\times 10^{-5}$ 4 E_γ : Other: 156.03 (1968Ma14). I_γ : From $I_\gamma(92.464\gamma)=45.1$ 18 and the Adopted gammas branching ratios.
169.441 5	4.4 4	169.445	3 ⁻	0.0	1 ⁻	[E2]		0.566	%I γ =0.51 5 $\alpha(\text{N})=0.01384$ 20; $\alpha(\text{O})=0.00201$ 3; $\alpha(\text{P})=2.20\times 10^{-5}$ 3 $\alpha(\text{K})=0.261$ 4; $\alpha(\text{L})=0.231$ 4; $\alpha(\text{M})=0.0581$ 9 E_γ : Other: 169.54 keV (1968Ma14). I_γ : From Adopted gammas.

† Additional information 1.

^{188}Re IT decay (18.59 min) 1968Ma14,1964Ta07,1964Bu10 (continued) $\gamma(^{188}\text{Re})$ (continued)

‡ From adopted gammas, unless otherwise.

From intensity balances, unless otherwise stated.

@ For absolute intensity per 100 decays, multiply by 0.115 5.

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Legend

Decay SchemeIntensities: $I_{(\gamma+ce)}$ per 100 parent decays
%IT=100.0

- $I_{\gamma} < 2\% \times I_{\gamma}^{max}$
- $I_{\gamma} < 10\% \times I_{\gamma}^{max}$
- $I_{\gamma} > 10\% \times I_{\gamma}^{max}$
- - - -→ γ Decay (Uncertain)
- Coincidence

