

${}^{24}\text{O}$ β^- decay [1999Re16,2015Ca09](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty		NDS 186, 2 (2022)	31-Mar-2022

Parent: ${}^{24}\text{O}$: $E=0.0$; $J^\pi=0^+$; $T_{1/2}=72$ ms 5; $Q(\beta^-)=10.96\times 10^3$ 19; $\% \beta^-$ decay=100.0

${}^{24}\text{O}$ - $T_{1/2}$: From ${}^{24}\text{O}$ Adopted Levels.

${}^{24}\text{O}$ - $Q(\beta^-)$: From [2021Wa16](#).

[1999Re16](#): Ta(${}^{36}\text{S},x$) $E=2.8$ GeV. Magnetic spectrometer, measured tof, energy loss in Si, $\beta\gamma$ coincidence.

[2015Ca09](#): ${}^{24}\text{O}$ was produced via fragmentation of 77.6 MeV/nucleon ${}^{36}\text{S}$ primary beam hitting a ${}^9\text{Be}$ target of thickness=237 mg/cm², and separated by LISE achromatic spectrometer at GANIL. Isotope identification was performed by energy loss in two silicon detectors (ΔE) of thickness 500 μm and time-of-flight. ${}^{24}\text{O}$ isotopes implanted in double-sided-silicon-strip-detector (DSSSD). A Si(Li) detector was placed after DSSSD to control implantation depth. Four segmented Ge clover detectors of EXOGAM array placed around DSSSD detector. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ and $\beta\gamma$ coincidences. Deduced ${}^{24}\text{F}$ level scheme, spin and parity.

 ${}^{24}\text{F}$ Levels

E(level) [†]	J^π [‡]	$T_{1/2}$	Comments
0	(3 ⁺)	382 ms 16	
521.6 3	(2 ⁺)		J^π : Other: 2 ⁺ in 2015Ca09 .
1831.4 4	(1 ⁺)		
3810+x			E(level): From $S(n)=3810$ 100 (${}^{24}\text{F}$) and $x<7.15\times 10^3$ 21 [from $Q(\beta^-)$ (${}^{24}\text{O}=10.96\times 10^3$ 19)- $S(n)$ (${}^{24}\text{F}$) (2021Wa16)].

[†] From $E\gamma$, except otherwise noted.

[‡] From Adopted Levels.

 β^- radiations

E(decay)	E(level)	$I\beta^-$ [†]	Log ft	Comments
(4×10^3 4)	3810+x	42 5		$I\beta^-$: From $\% \beta^- n=42$ 5 in ${}^{24}\text{O}$ g.s. Adopted Levels.
(9.13×10^3 19)	1831.4	57 4	4.09 6	av $E\beta=4326$ 95 $I\beta^-$: From 2015Ca09 .

[†] Absolute intensity per 100 decays.

[‡] Estimated for a range of levels.

 γ (${}^{24}\text{F}$)

$I\gamma$ normalization: From experimental β and γ rates,

E_γ [†]	I_γ ^{‡#}	E_i (level)	J_i^π	E_f	J_f^π	Comments
521.5 3	21 2	521.6	(2 ⁺)	0	(3 ⁺)	E_γ, I_γ : Other: 521 1 (2015Ca09) and 14.3 20 (1999Re16), respectively.
1309.5 5	18 2	1831.4	(1 ⁺)	521.6	(2 ⁺)	E_γ, I_γ : Other: 1309 1 (2015Ca09) and 12.0 26 (1999Re16), respectively.
1831.6 5	39 3	1831.4	(1 ⁺)	0	(3 ⁺)	E_γ, I_γ : Other: 1830 1 (2015Ca09) and 28.3 30 (1999Re16), respectively.

[†] From [1999Re16](#). Values of [2015Ca09](#) are listed in the comments.

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${}^{24}\text{O}$ β^{-} decay **1999Re16,2015Ca09** (continued)

$\gamma({}^{24}\text{F})$ (continued)

‡ From **2015Ca09**. Values of **1999Re16** are listed in the comments. **2015Ca09** value chosen by the evaluators for better statistics, $\approx 10^5$ implants on the DSSSD, which is larger by a factor of 10 than that reported in **1999Re16**.

Absolute intensity per 100 decays.

${}^{24}\text{O} \beta^-$ decay 1999Re16,2015Ca09

Decay Scheme

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

Legend

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

