^{7}Be ε decay 2002Ti10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Hu, Tilley, Kelley, Godwin et al.	NP A708,3 (2002)	23-Aug-2001

Parent: ^{7}Be: E=0.0; $J^{\pi}=3/2^{-}$; $T_{1/2}$=53.22 d *6*; Q(ε)=861.815 *18*; %ε decay=100

1949Se20: experiments on the effect of atomic electrons on the decay constant of ^{7}Be.

1953Kr16: comparison of the values of the disintegration constant of ^{7}Be In Be, BeO and BeF_2.

1956Bo36: nouvelle determination de la difference des periodes de ^{7}Be matallique et de $^{7}BeF_2$.

1970Jo21: ^{7}Be, measured $T_{1/2}$ In chemical compounds, deduced relative electron density At nucleus.

1972Sz02: ^{10}Be(P,α) E=60-180 keV, measured σ(E), branching ratio for ^{7}Be(ε)^{7}Li, solid-state detectors.

1998Ga08: ^{7}Be(ε)[from Be proton irradiation], measured K, L capture x-ray spectra. High efficiency calorimeter.

1999Hu20: ^{7}Be(ε), measured E_γ, I_γ and $T_{1/2}$, deduced dependence on chemical environment.

1999Ra12: ^{7}Be(ε)[from Li(p,X)], measured $T_{1/2}$ for source implanted In Au and Al_2O_3.

The decay scheme is complete since only levels in ^{7}Li below the decay energy are populated.

Evaluation by R. G. Helmer and E. Schonfeld, 1996 and edited in December 2000. This evaluation was done as part of a collaboration of evaluators from Laboratoire National Henri Becquerel (LNHB) in France; Physikalisch-Technische Bundesanstalt (PTB) in Germany; HMS Sultan and AEA Technology in the United Kingdom; Khlopin Radium Institute (KRI) in Russia; Centro de Investigaciones Energeticas, Medioambientales, y Tecnologicas (CIEMAT) and Universidad Nacional a Distancia (UNED) in Spain; and Brookhaven National Laboratory (BNL), Lawrence Berkeley National Laboratory (LBNL), and Idaho National Engineering and Environmental Laboratory (INEEL) in the United States.

^{7}Li Levels

E(level)	J^{π}	$T_{1/2}$
0.0	$3/2^{-}$	
477.612 *3*	$1/2^{-}$	72.8 fs *20*

ε radiations

E(decay)	E(level)	Iε†	Log *ft*	Comments
(384.2 *10*)	477.612	10.44 *4*	3.556 *2*	εK=0.9700; εL=0.03004 Iε: Adopted weighted average of 10 +*20*−*7* [L. H. Rumbaugh et al., Phys. Rev. 54 (1938) 657], 10.7 *20* (1949Wi13), 11.8 *12* (1949Tu06), 12.3 *6* (1951Di12), 10.35 *8* (1969TaZX), 10.47 *20* (1970MuZU), 10.42 *18* (1973Po10), 10.35 *8* (1974Go26), 10.10 *45* (1983Ba15), 10.61 *23* (1983Da14), 10.6 *5* (1983Do07), 10.9 *11* (1983Ku10), 10.7 *2* (1983Ma34), 9.8 *5* (1983No03), 11.4 *7* (1984Ev01), 10.61 *17* (1984Fi10), and 10.49 *7* (1984Sk01). The weighted average of these values is 10.444 with an internal uncertainty of 0.039, a reduced-χ^2 of 1.35, and an external uncertainty of 0.045. Iε: The adopted branching is dominated by the values of 1969TaZX, 1974Go24, and 1984Sk01 which contribute 23%, 23%, and 30% of the relative weight, respectively. The largest contribution to the reduced-χ^2 is 0.6 from 1951Di12. Iε: Values not used are: 10.32 *16* (1962Ta11, replaced by 1969TaZX), 10.5 *2* [W. Poenitz, J. Nucl. Energy 20 (1966) 825, replaced by 1973Po10].
(861.8 *14*)	0.0	89.56 *4*	3.324 *1*	εK=0.9700; εL=0.03004

† Absolute intensity per 100 decays.

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γ(^{7}Li)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[‡]	Comments
477.6035 *20*	10.44 *4*	477.612	1/2⁻	0.0	3/2⁻	M1(+E2)	0.20 *20*	7.3×10^{-7} *11*	E_γ: from evaluation of 2000He14. δ: from measured α value (1964Kr04). α: measured value (1964Kr04). Theoretical value interpolated from tables of 1976Ba63 are 7.73×10^{-7} for M1 and 2.96×10^{-6} for E2.

[†] Absolute intensity per 100 decays.

[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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Decay Scheme

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