^{13}O εp decay:8.58 ms 2005Kn02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, J. E. Purcell and C. G. Sheu	NP A968,71 (2017)	1-Jan-2017

Parent: ^{13}O: E=0; $J^{\pi}=3/2^{-}$; $T_{1/2}$=8.58 ms *8*; Q(εp)=15826 *10*; %εp decay=11.3 *23*

^{13}O-$T_{1/2}$: from weighted average of (1965Mc09,1970Es03,1990As01) (external errors).

^{13}O-Q(εp): from (2017Wa10).

2005Kn02: The ^{13}O ions were produced At the IGISOL facility via the ^{12}N(p,2n) reaction by impinging an E(p)≈45 MeV beam on a 1 mg/cm^2 target. The ^{13}O ions recoiled out of the target and were collected In a helium carrier gas which delivered them to the mass separator. The ions were implanted on a 30 μg/cm^2 carbon foil. The implantation target was surrounded by three position sensitive ΔE-E Si detector telescopes which triggered the data acquisition and the ISOLDE Si ball.

The observed proton energy spectrum was analyzed using Breit-Wigner peak shapes, and the best fit parameters for decay groups was deduced using MINUIT. The absolute intensity for decay branches was not directly measured, hence the results are normalized to a prior measurement of the strong 9.8% *20* ^{13}N*(3502) decay to $^{12}C_{g.s.}$ (1990As01).

The (2005Kn02) data set has the highest statistics and covers a broader energy range, when compared to the prior measurements (1965Mc09,1970Es03,1990As01); furthermore the discussion on the line shape analysis suggests the results of (2005Kn02) should Be adopted. Noteworthy differences between other measurements are for decay from ^{13}N*(8918), (2005Kn02) observe a stronger P_1 branch than earlier measurements. Second, No evidence is seen for decay of ^{13}N*(10360); the difference is attributed to the more sophisticated lineshape analysis.

A subtle note to understand the (2005Kn02) manuscript: In Table 2 the ^{13}N*(15065) % of all β-decays value includes unobserved contributions from γ decay, proton decay and α decay.

^{12}C Levels

E(level)†	J^{π}†
0.0	0^+
4439.82	2^+
7654.07	0^+

† From Adopted Levels.

Delayed Protons (^{12}C)

E(p)†	E(^{12}C)	I(p)‡	E(^{13}N)	Comments
917 *8*	4439.82	2.4 *3*	7376	
1438.6 *19*	0.0	100	3502	
2341 *10*	4439.82	4.5 *3*	8918	
2856 *7*	4439.82	1.06 *11*	9476	
5015 *8*	0.0	0.09 *4*	7376	
5046.4 *5*	7654.07	0.011 *2*	15064	
6438 *10*	0.0	5.3 *4*	8918	
6953 *7*	0.0	1.40 *13*	9476	
8014 *1*	4439.82	0.030 *5*	15064	
9006 *28*	0.0	0.15 *4*	11700	
10450 *83*	0.0	0.11 *9*	13264	E(p) , E(level)(^{13}N) from (2005Kn02) using (2017Wa10).
12111.8 *4*	0.0	0.049 *7*	15064	
12.33×10^3 *18*	0.0	0.04 *3*	15300	

† E(p) deduced from Q (2017Wa10) and ^{13}N/^{12}C level energies In ENSDF except where noted.

‡ For absolute intensity per 100 decays, multiply by 0.098 *20*.

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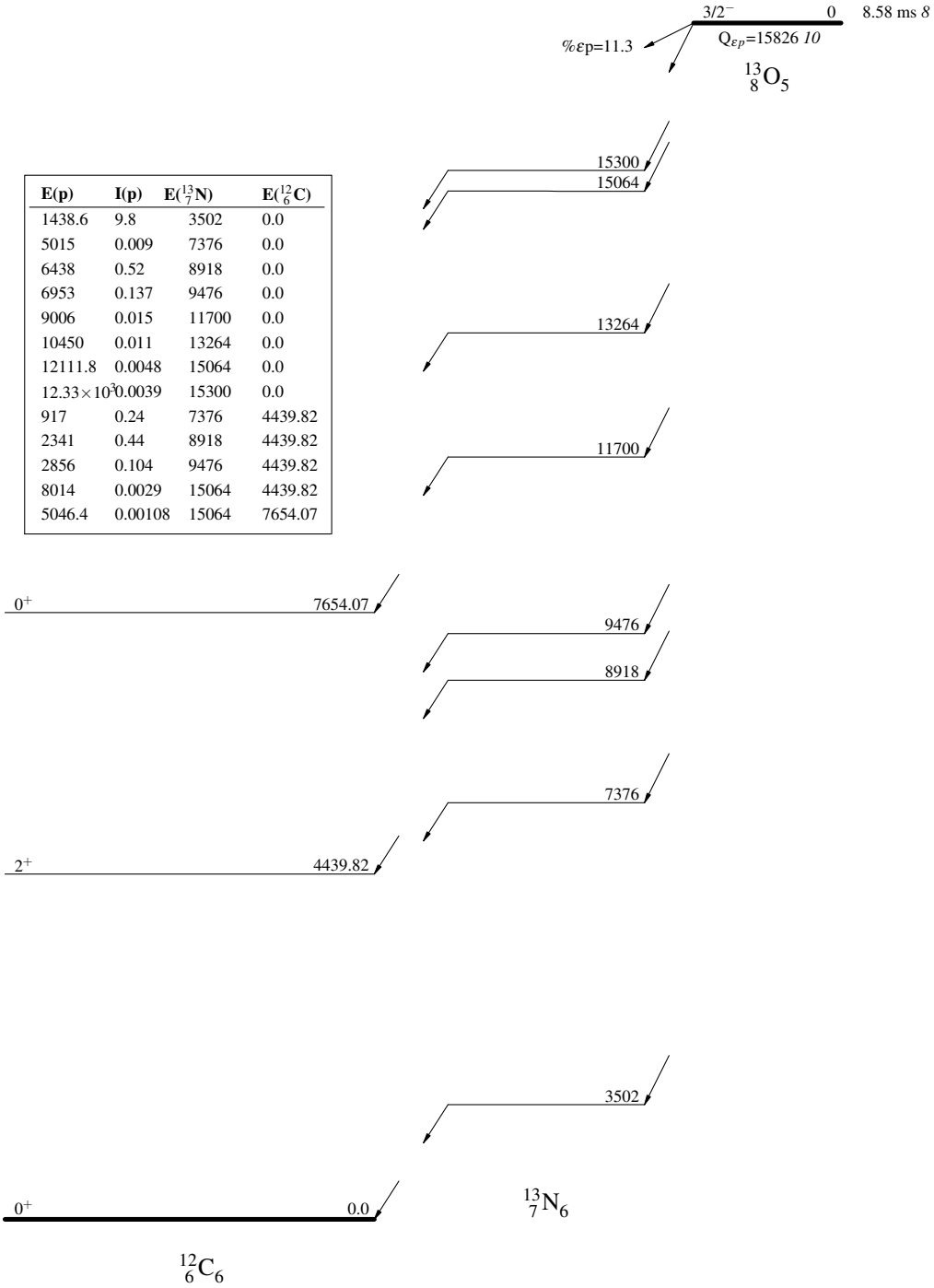
Decay Scheme

I(p) Intensities: I(p) per 100 parent decays



E(p)	I(p)	E($^{13}_{7}$N)	E($^{12}_{6}$C)
1438.6	9.8	3502	0.0
5015	0.009	7376	0.0
6438	0.52	8918	0.0
6953	0.137	9476	0.0
9006	0.015	11700	0.0
10450	0.011	13264	0.0
12111.8	0.0048	15064	0.0
12.33×10^{3}	0.0039	15300	0.0
917	0.24	7376	4439.82
2341	0.44	8918	4439.82
2856	0.104	9476	4439.82
8014	0.0029	15064	4439.82
5046.4	0.00108	15064	7654.07