## Adopted Levels, Gammas

| History | | | |
|---|---|---|---|
| Type | Author | Citation | Literature Cutoff Date |
| Full Evaluation | J. H. Kelley, G. C. Sheu | ENSDF | 01-May-2017 |

Q($\beta^-$)=13162 *23*; S(n)=734 *18*; S(p)=2.337×10$^4$ *3*; Q($\alpha$)=−15052 *20* 2017Wa10

**Previous Level Evaluations:** 1971Aj02, 1977Aj04, 1982Aj01, 1986Aj04, 1993Ti07.

**Enhancement of neutron density profile:**

Analyses of the $^{17}$C density profile have been carried out based on measurements of various reaction cross sections and momentum distributions of breakup products. The excess of neutrons in $^{17}$C do not appear to form a halo. See discussions in references listed below.

2004Sa14: E($^{17}$C)=49 MeV/nucleon, carbon target, $\sigma_{1n}$=84 mb *9*, FWHM of $P^{c.m.}_{parallel}$=111 MeV/c *3* and of $P^{c.m.}_{px}$=140 MeV/c *3*. Also measured FWHM of $P^{c.m.}_{parallel}$=121 MeV/c *7* on a Ta target. Deduce J$^\pi$=3/2$^+$.

2001Ma08,2001Ma21: E($^{17}$C)≈62 MeV/nucleon, $^9$Be target surrounded by 11 NaI detectors; $\sigma_{1n}$=115 mb *14*.

2004Wu03: E($^{17}$C)≈79 MeV/nucleon, carbon target, $\sigma_{reaction}$=1350 mb. See also comments on deformation in (2014Fa02).

2005Wu01: E($^{17}$C)≈79 MeV/nucleon, carbon target, $\sigma_{1n}$=116 mb *18*, $\sigma_{2n}$=70 mb *+33−18*, $\sigma_{3n}$=40 mb *+30−13*.

1998Ba28: E($^{17}$C)≈84 MeV/nucleon, Be target, $\sigma$(Be)$_{1n}$=26 mb and FWHM($^{16}$C P$_{parallel}$)=145 MeV/c *5*.

1995Ba28: E($^{17}$C)≈96.8 MeV/nucleon, Be target, $\sigma$(Be)$_{1n}$=40.9 mb *43* and $\Gamma$($^{16}$C P$_{parallel}$)=94 MeV/c *19*.

1998Ba87,2001Co06: E($^{17}$C)≈910 MeV/nucleon, carbon target, FWHM($^{16}$C P$_{parallel}$)=141 MeV/c *6* and $\sigma_{1n}$=129 mb *22*.

2001Oz03: E($^{17}$C)=965 MeV/nucleon, carbon target, $\sigma_{interaction}$=1056 mb *10*, analyzed relation of $\sigma_i$ to effective matter radius: $R_{rms}$≈2.72 fm *3*. See also (2004Oz02).

2000Sa47: E($^{17}$C)=49 MeV/nucleon, carbon target,FWHM($^{16}$C P$_{parallel}$)$_{lab}$=111 MeV/c *3*, $\sigma_{1n}$=84 mb *9*. The authors suggest J$^\pi$=3/2$^+$ from a 1d$_{5/2}$ neutron coupled to the $^{16}$C J$^\pi$=2$^+_1$ state.

*For experimental reviews mainly on the nuclear radius see:* 1997Or03, 2000Co31, 2000Oz03, 2001Lo20, 2009Ch45, 2011Al11.

*For theoretical reviews mainly on the nuclear radius see:* 1992La13, 1996Sh13, 1997Ki22, 1999La04, 1998Ri02, 1999Kn04, 2000Be58, 2000Gu04, 2001Le21, 2002Gu10, 2011Fo18, 2013Lu02, 2015Ha20, 2016Fo24, 2016Ya05.

**Theoretical reviews mainly of $^{17}$C:** 1989Wa06, 1996Re19, 2008Ka39, 2008Sa39, 2008Su22, 2009Su17, 2010Ti02, 2012Am01, 2013Am01, 2014Fo02.

**General theoretical reviews of carbon isotopes:** 1996Re19, 1996Ka14, 1998Sh16, 2000De35, 2003Sa50, 2003Su09, 2003Th06, 2004Th11, 2004Sa58, 2005Sa63, 2006Le33, 2006Ta28, 2007Sa50, 2009Um05, 2010Co05, 2014Ja14.

**General theoretical reviews including many nuclides:** 1987Sa15, 1993Po11, 1996Su24, 1997Ho04, 1997Ba54, 2001Ka66, 2002Ka73, 2002Me12, 2003Le34, 2004La24, 2004Ne16, 2004Su23, 2006Ko02, 2007Ha53, 2007Do20, 2010Ha07, 2012Am06, 2012Yu07, 2015Sh21.

## $^{17}$C Levels

### Cross Reference (XREF) Flags

| | | | | | |
|---|---|---|---|---|---|
| A | $^1$H($^{17}$C,p′$\gamma$) | H | $^9$Be($^{40}$Ar,$^{17}$C) | O | $^{208}$Pb($^{18}$C,$^{17}$C) |
| B | $^1$H($^{17}$C,16$\varepsilon$N),$^1$H($^{19}$C,16$\varepsilon$N) | I | C($^{36}$S,X$\gamma$) | P | $^{208}$Pb($^{18}$O,$^{17}$C),$^{207}$Pb($^{18}$O,$^{17}$C) |
| C | $^1$H($^{18}$C,$^{17}$C$\gamma$) | J | $^{14}$C($^{12}$C,$^9$C) | Q | U(P,$^{17}$C) |
| D | $^1$H($^{19}$C,2n17c$\gamma$) | K | $^{17}$B $\beta^-$ decay:5.08 ms | R | $^{232}$Th($^{18}$O,$^{17}$C) |
| E | $^9$Be($^{17}$C,X) | L | $^{48}$Ca($^{18}$O,$^{17}$C) | S | $^{232}$Th($^{22}$Ne,$^{17}$C) |
| F | $^9$Be($^{18}$C,$^{17}$C$\gamma$):riken | M | $^{93}$Nb($^{22}$Ne,$^{17}$C) | | |
| G | $^9$Be($^{18}$C,$^{17}$C$\gamma$):nscl | N | $^{208}$Pb($^{17}$C,$^{17}$C) | | |

| E(level) | J$^\pi$ | T$_{1/2}$ | XREF | Comments |
|---|---|---|---|---|
| 0 | 3/2$^+$ | 193 ms *6* | ABCDEFGHI KLMNOPQRS | %$\beta^-$=100; %$\beta^-$n=26.0 *18*<br>T$_{1/2}$: 193 ms *6* is accepted. This is the weighted average of the values 193 ms *6* (1995Sc03) 191 ms *12* (P.L. Reeder et al., Int. Conf. on Nucl. Data for Science and Technology, May 9-13, 1994, Gatlinburg, Tennessee ), 180 ms *31* (1988Sa04), 202 ms *17* (1986Cu01), 220 ms *80* (1986Du07). See other reported values 174 ms *31* (1991Re02) and 188 ms *10* (1995ReZZ,2008ReZZ). Also see 191 ms *6* from analysis |

Continued on next page (footnotes at end of table)

## Adopted Levels, Gammas (continued)

### $^{17}$C Levels (continued)

| E(level) | $J^\pi$ | $T_{1/2}$ | XREF | Comments |
|---|---|---|---|---|
| | | | | given in 2015Bi05. |
| | | | | %$\beta^-$n: The experimental works of (1988Mu08) and (1995Sc03) found %$\beta^-$n<11% and (10.8 *22*)%, respectively, but in those cases the detectors had rather high energy thresholds. In the works of Reeder et al., a zero-threshold $^3$He counter was used. The evaluator favors the latest published value from 1994 Gatlinburg (26.0 *18*)%, but see also associated values of (32.0 *27*)% (1991Re02) and (28.4 *13*)% from unpublished comments (1995ReZZ,2008ReZZ). |
| | | | | %$\beta^-$n from 1994 Reeder. |
| 217 *1* | $1/2^+$ | 366 ps *+15−10* | CD FG I K O | E(level): from weighted average of all reported values: $E_x$= 210 keV *4* (2005El07), 212 keV *8* (2008Su12), 218 keV *1* (2015Sm03), 201 keV *15* (2008St18), and 217 keV *2* (2013Ue01). $T_{1/2}$: from (2015Sm03). See also $T_{1/2}$=404 ps *15* (*25* ps *sys.*) (2008Su12). |
| 332 *2* | $5/2^+$ | 15.1 ps *+24−23* | A CD FG IJKL O | E(level): from weighted average of reported values at: $E_x$= 331 keV *6* (2005El07), 333 keV *10* (2008Su12), 332 keV *1* (2015Sm03), 329 keV *5* (2008St18), 331 keV *2* (2013Ue01). See also $E_x$= 310 keV *40* (2007Bo10), 292 keV *20* (1977No08), 295 keV *10* (1982Fi10), $T_{1/2}$: from (2015Sm03). See also $T_{1/2}$=13.1 ps *4* (*3.3* ps *sys.*) (2008Su12). |
| 2150 *70* | $7/2^+$ | 0.53 MeV *4* | B J | E(level): from Method of Best Representation averaging technique (2014Bi14). $E_x$=2060 keV 50 (2007Bo10) and 2200 keV *30* (2008Sa03). $T_{1/2}$: From (2008Sa03), see also Γ=250 keV *100* (2007Bo10). $J^\pi$: from (2008Sa03): DWBA analysis of $\sigma(\theta)$. |
| 2710 *20* | $1/2^-$ | 0.04 MeV *1* | K | |
| 3085 *25* | $9/2^+$ | 0.10 MeV *5* | B J | E(level): from Weighted Average of $E_x$=3050 keV *30* (2008Sa03) and 3100 keV *20* (2007Bo10). $T_{1/2}$: From (2007Bo10). $J^\pi$: From (2008Sa03): DWBA analysis of $\sigma(\theta)$. |
| 3930 *20* | $3/2^-$ | 0.16 MeV *4* | K | |
| 4050 *20* | $(5/2^-)$ | 0.06 MeV *6* | K | |
| 4250 *20* | $(5/2^+,7/2^+,9/2^+)$ | 0.14 MeV *8* | J | |
| 4780 *20* | | 0.3 MeV *3* | K | |
| 6080 *30* | | 2.5 MeV *7* | K | |
| 6200 *30* | $(5/2^+)$ | 0.35 MeV *15* | B J | E(level),$T_{1/2}$,$J^\pi$: from (2007Bo10). See also $E_x$=6130 keV *90* and Γ=0.26 MeV *+40−26* (2008Sa03). |
| 7470 *30* | $(11/2^+)$ | 0.58 MeV *10* | J | |
| 8850 *50* | $(9/2^+)$ | 0.66 MeV *20* | J | |
| 10560 *30* | $(13/2^+)$ | 0.30 MeV *10* | J | |
| 11710 *50* | | 0.30 MeV *15* | J | |
| 12610 *30* | | 0.45 MeV *20* | J | |
| 13700 *50* | | 0.6 MeV *2* | J | |
| $16.3\times10^3$? *1* | | 0.5 MeV *2* | J | |

## Adopted Levels, Gammas (continued)

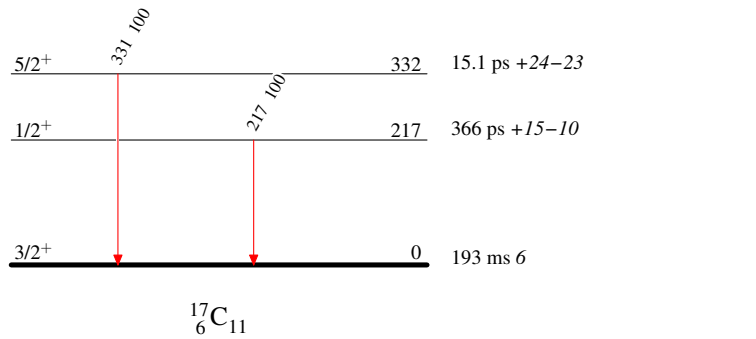
### $\gamma(^{17}C)$

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ | $I_\gamma$ | $E_f$ | $J_f^\pi$ | Comments |
|---|---|---|---|---|---|---|
| 217 | $1/2^+$ | 217 *2* | 100 | 0 | $3/2^+$ | B(M1)↓=1.04×10$^{-2}$ *+3−12* |
| 332 | $5/2^+$ | 331 *2* | 100 | 0 | $3/2^+$ | B(M1)↓=7.12×10$^{-2}$ *+127−96* |

## Adopted Levels, Gammas

### Level Scheme

Intensities: Type not specified




$^{17}_{6}C_{11}$