

6129 keV line in 160

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Levels in 160



0.5 keV difference between Bergem and value in NNDC

x	REFs J ^π	T _{1/2}	/Decay E(γ)	Ι (γ)	M (γ)	Final Le	vels
E(level) (keV)	XREF	J ^π (level)	T _{1/2} (level)	Ε (γ) (keV)	Ι(γ)	М (ү)	Final Levels
0.0	ABCDEF HIJKLMNOPQ	0+	STABLE				
6049.4 10	ABC EF IJK M P	0+	67 ps 5	6048.2 10		[E0]	0.0 0+
6129.89 <i>4</i>	ABC EF HIJKL NOPQ	3-	18.4 ps 5	6128.63 <i>4</i>	100	[E3]	0.0 0+
6917.1 <i>6</i>	ABC EF HI KLMNOPQ	2+	4.70 fs 13	787.2 <i>6</i> 867.7 <i>12</i> 6915.5 <i>6</i>	≤0.008 0.027 <i>3</i> 100	[E1] [E2] [E2]	6129.89 3- 6049.4 0+ 0.0 0+
7116.85 <i>14</i>	AB EF HIJKLM OPQ	1-	8.3 fs 5	986.93 <i>15</i> 1067.5 <i>10</i> 7115.15 <i>14</i>	0.070 <i>14</i> <6E-4 100	[E2] [E1] [E1]	6129.89 3- 6049.4 0+ 0.0 0+

TABLE IV. Calibration sources and their γ -ray energies used for calibration and detector system nonlinearity.

Source	References	Energies (keV)			
⁵⁶ Co	25	846.764(6)	1037.844(4)		
		1175.099(8)	1238.287(6)		
		1360.206(6)	1771.350(15)		
		1963.714(12)	2015.179(11)		
		2034.759(11)	2598.460(10)		
		3009.596(17)	3201.954(14)		
		3253.417(14)	3272.998(14)		
		3451.154(13)			
110 Ag m	25	446.811(3)	620.360(3)		
		657.762(2)	677.623(2)		
		687.015(3)	706.682(3)		
		744.277(3)	763.944(3)		
		818.031(4)	884.685(3)		
		937.493(4)	1384.300(4)		
		1475.788(6)	1505.040(5)		
		1562.302(5)			
¹⁹² Ir	25	316.5080(8)	416.471 9(12)		
		468.071 5(12)	484.577 9(13)		
		588.585 1(16)	604.414 6(16)		
		612.465 7(16)	884.542 3(20)		
²⁰⁷ Bi		569.702(2)	1063.662(4)		
¹⁶ N	23	6129.142(32)			
	24	6129.119(40)			
		weighted mean	6129.133(25)		

Where does the NNDC data come from?



???

Level in overview table and source data do not match

The measurements are the same as quoted by Bergem

D.R. Tilley et al. / Energy levels of light nuclei A=16-17

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TABLE 16.13
Energy levels of ¹⁶O ^a)

E_{x} (MeV±keV)	$J^{\pi}; T$	K^{π}	$\Gamma_{c.m.}$ or τ_m (keV)	Decay	Reactions
0 6.0494±1.0	0+; 0 0+; 0	0+	stable $\tau_{\rm m} = 96 \pm 7 \text{ ps}$	π	5, 7, 11–19, 22–24, 30, 32–34, 37–68, 70–82 5, 7, 11–13, 15, 17, 19, 21, 23, 30, 32–34, 38,
	, ,		m v === . F		39, 43, 44, 47, 54, 55, 57, 66, 67, 70, 71, 73, 79, 81
6.129893±0.04	3-; 0		$\tau_{\rm m} = 26.6 \pm 0.7 \text{ ps};$ = $+0.556 \pm 0.004$	γ	1, 5, 7, 11–13, 15, 17–19, 21, 30–34, 37–39, 43–46, 49–51, 53, 54, 66–68, 70, 71, 73, 79,
6.9171 ± 0.6	2+;0	0+	$\tau_{\rm m} = 6.78 \pm 0.19 \text{ fs}$	γ	81 1, 5, 7, 11–13, 15, 17, 19, 30–34, 37, 38, 42– 47, 49, 50, 53–55, 67, 68, 70, 71, 73, 78, 80
7.11685 ± 0.14	1-; 0		$\tau_{\rm m} = 12.0 \pm 0.7 \text{ fs}$	γ	1, 5, 7, 11–13, 17, 30–34, 37–39, 42–44, 46,
8.8719±0.5	2-; 0		$\tau_{\rm m} = 180 \pm 16 \text{ fs}$	γ, α	47, 50, 66–68, 70, 71, 73, 81 5, 7, 11, 12, 16, 19, 30, 31, 33, 37–39, 43,

ADOPTED LEVELS, GAMMAS for ¹⁶O

<u>Authors:</u> J.H. Kelley, D.R. Tilley, H.R. Weller and C.M. Cheves | <u>Citation:</u> Nucl. Physics 564 1 (1993) | <u>Cutoff date:</u> 31-DEC-1992

39. ${}^{16}N(\beta^-){}^{16}O$

 $Q_{\rm m} = 10.419$

The ground state of ^{16}N decays to seven states of ^{16}O : reported branching ratios are listed in Table 16.25. The ground-state transition has the unique first-forbidden shape corresponding to $\Delta J = 2$, fixing J^{π} of ^{16}N as 2^{-} : see (59AJ76). The unique first-forbidden decay rates to the 0^{+} ground state and 6.06 MeV level are well reproduced by a large-basis $(0 + 2 + 4)\hbar\omega$ shell-model calculation (92WA25). The decays to odd-parity states (see Table 16.25) are well reproduced by recent calculations of Gamow-Teller matrix elements (93CH1A). For the β -decay of $^{16}N^*(0.12)$, see reaction 1 in ^{16}N .

The β -delayed α -decays of $^{16}O^*(8.87, 9.59, 9.84)$ have been observed: see (71AJ02). The parity-forbidden α -decay from the 2^- state $^{16}O^*(8.87)$ has been reported: $\Gamma_{\alpha} = (1.03 \pm 0.28) \times 10^{-10}$ eV $[E_{\alpha} = 1282 \pm 5 \text{ keV}]$: see (77AJ02).

Transition energies derived from γ -ray measurements are: $E_x = 6130.40 \pm 0.04$ keV $[E_{\gamma} = 6129.142 \pm 0.032$ keV (82SH23)], $E_x = 6130.379 \pm 0.04$ $[E_{\gamma} = 6129.119 \pm 0.04$ keV (86KE15)] and $E_x = 7116.85 \pm 0.14$ keV $[E_{\gamma} = 7115.15 \pm 0.14$ keV]. See (77AJ02). See also p. 16 in (82OL01).

Let's go back in time...

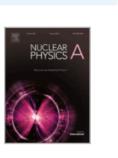


Somehow couldn't download the publications anymore, but if I remember correctly the value for the level and transition energy changes between these two publications wit the measured gamma energy not really changing?

Typo? Wrong calculation of level from gamma energy?



Nuclear Physics A Volume 375, Issue 1, 1 February 1982, Pages 1-168



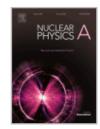
Energy levels of light nuclei $A = 16-17 \Leftrightarrow$

F. Ajzenberg-Selove

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Nuclear Physics A



Volume 460, Issue 1, 24 November 1986, Pages 1-110

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What others say

So it looks like everything is fine with the 208Pb energies after all!

D.F. Measday | Physics Reports 354 (2001) 243-409

Table 5.2 Commonly used calibration γ -rays, showing the changes in the last 20 years. The 1979 data are the compendium of Helmer et al. [431], plus the hydrogen line of Greenwood and Chrien [432]. The latest compendium is that of Helmer and van der Leun [429]. Other data are from [433,434]. We use $E_{\lambda} = 1239.84244$ (37) eV nm

Source	1979 (eV)	1999 (eV)
¹⁹⁸ Au	411,804.4 (11)	411,802.05 (17)
⁶⁰ Co	1,332,502 (5)	1,332,492 (4)
¹⁵² Eu	121,782.4 (4)	121,781.7 (3)
	244,698.9 (10)	244,697.4 (8)
	344,281.1 (19)	344,278.5 (12)
$^{16}\mathrm{N}/^{13}\mathrm{C}(\alpha,n)$	6,129,270 (50)	$6,129,140 (30)^a$
m_e	511,003 (2)	510,998.902 (21) ^b
$np \rightarrow \gamma d$	2,223,247 (17)	$2,223,258.3 (23)^{c}$

^aThe site www.nndc.bnl.gov and [435] seem to use an erroneous value of E_x = 6,129,893 (40) eV and E_γ = 6,128,630 (40) eV. We use the average of 3 determinations [436–438], as confirmed by Wapstra [434].



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Table 2. The energy of photons E_{γ} emitted by (3⁻; 0) excited level of ¹⁶O.

N	Reaction	Reported energy [keV]	Year, reference	Corrected E_{γ} [keV]
1	$^{16}\text{N}(\beta^{-})^{16}\text{O}$	$E_{\gamma} = 6129.170 \pm 0.043$	1975, [<mark>24</mark>]	$E_{\gamma} = 6129.03 \pm 0.04$
2	$^{13}\text{C}(\alpha, n)^{16}\text{O}$	$E_{\gamma} = 6129.266 \pm 0.053$	1981, [<mark>25</mark>]	$E_{\gamma} = 6129.24 \pm 0.05$
3	19 F $(n,\alpha)^{16}$ O	$E_{\gamma} = 6129.119 \pm 0.040$	1986, [<mark>26</mark>]	$E_{\gamma} = 6129.12 \pm 0.04$
4	(3 ⁻ ; 0) ¹⁶ O level	$E_x = 6129.893 \pm 0.040$	1993, [<mark>27</mark>]	$E_{\gamma} = 6128.63 \pm 0.04$

in the present reference value of the energy of 198 Au γ -rays. Here we would like to mention that the energy E_{γ} in the last line of table 2 is definitely in contradiction with the values in the first three lines. It is not clear from [27] how this value was obtained and why it is so different.

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ENERGY CALIBRATION FOR 2-13 MeV GAMMA RAYS

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4. The ¹⁶O calibration gamma ray of 6129 keV

The consistency between the two scales was checked in the following comparison. Utrecht [18] determined the γ -ray energy of the lowest occurring γ -transition in 16 O in the 198 Au scale as 6129 266(54) eV*, which corresponds to 6129 228 eV'. This value should be compared with a Los Alamos value 6129 121(22) eV' derived from a difference [19] of 121174(21) eV* with the neutron-capture γ -ray to 3 T and a McMaster [20] value 6129 095(40) eV' measured through comparison with 14 N(n, γ) γ -rays (slightly corrected in view of the discussion of 15 N below). The Utrecht "diffraction" value is 18(10) ppm higher than the averaged "mass-spectrometry" result.

Proposed accepted value: 6129140(30) eV'.

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bObserved annihilation radiation is slightly less than $m_e c^2$.

^cValue of [433], as corrected by Wapstra [434].