Adopted Levels

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. E. Purcell#, C. G. Sheu*	NDS 130 1 (2015)	30-Jun-2015

$Q(\beta^-)$=18.5906 *32*; S(n)=6257.233 *2* 2012Wa38

The discovery of hydrogen isotope ^{3}H with an estimate of its mass was reported in 1934; see (2012Th01) for a historical review. In (1947Bl31,1947Bl32) it is shown that the spin of ^{3}H is 1/2 and the ratio of the magnetic moment of ^{3}H to that of the proton is found to be 1.067 *1*. For the ^{3}H spin, see also (1949Di31).

Calculations show that the ground state wave functions of ^{3}H and ^{3}He consist of a spatially symmetric S state (≈90%), a D state (≈9%), a mixed symmetry S′ state (≈1%) and a small P state (<0.1%). See (1979Sa15,1986Is01,1987Er07,1993Wu08,2002Ho09).

The ratio η_t of the asymptotic D state to S state of ^{3}H is −0.0418 *31*. This value is the inverse square of the uncertainty weighted average of the two most recent measurements (1993Ge04,1994Ko29). The following table lists references reporting values for η_t:

Also see (1988Fr01) where it was noted that there is a strong correlation between the triton and deuteron asymptotic ratios. Using several models, they obtained η_t/η_d=1.68 *4*. Using this ratio value and η_d=0.0256 *4* from (1990Ro02) gives η_t=−0.0430 *12*.

The charge and magnetic rms radii for ^{3}H are r_c=1.755 fm *86* and r_m=1.840 fm *181* (1994Am07). See (2005Go26) for electric and magnetic form factors for ^{3}H and ^{3}He as well as isoscalar and isovector versions and comparison with theory. Also see the reaction ^{3}H(e,e)^{3}H below for more details.

Triton magnetic moment, μ_t=+2.978962467 *26* μ_N. This value is obtained from a measurement of the ratio of the triton to proton magnetic moments μ_t/μ_p=1.0666399151 *30* (2011Ne15) and the value of the proton magnetic moment μ_p=+2.792847356 *23* μ_N reported in (2014Ol01). Also see Table XLI of (2012Mo42) which gives μ_t=2.978962448 *38*.

Reference	η_t	Comments
1981Bo04	-0.048 7	^{2}H(pol d,p)^{3}H, E_d=13 MeV
1982Bo06	-0.051 5	^{2}H(pol d,p)^{3}H, E_d=7-13 MeV
1989Vu01	-0.050 6	^{4}He(pol d,^{3}He)^{3}H, E_d=32-50 MeV
1992Da01	-0.043 2	DWBA analysis of sub-Coulomb (pol d,t) reactions; also see (1992Ge05), who argue that the uncertainty should be 0.004, not 0.002
1993Ge04	-0.0431 25	DWBA analysis of sub-Coulomb (pol d,t) reactions
1994Ko29	-0.0411 18	DWBA analysis of sub-Coulomb (pol d,t) reactions

^{3}H Levels

Cross Reference (XREF) Flags

A	^{1}H(^{6}He,α)	D	^{3}H(γ,n),(γ,nn)
B	^{2}H(n,γ) E=thermal	E	^{3}H(e,e)
C	^{2}H(n,n)		

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0	$1/2^+$	12.32 y *2*	AB	%β^-=100 μ=+2.978962467 *26* μ: from μ_t/μ_p=1.0666399151 *30* (2011Ne15) and μ_p=+2.792847356 *23* μ_N (2014Ol01). ^{3}H mass excess: 14949.8061 keV *22* (2012Wa38). ^{3}H binding energy: 8481.7986 keV *24*; S(n)=6257.2327 keV *22* using mass excess values from (2012Wa38). $T_{1/2}$: 12.32 y *2*=4500 d *8*=3.888×10^8 s *7*. $T_{1/2}$: The half-life value given here comes from (2000Ch01,2000Lu17). (2000Ch01) analyzed 16 measurements between 1940 and 1991 of ^{3}H half-life, rejected 3 and averaged the rest that ranged from 12.1 y to 12.58 y. They obtained a half-life of 12.32 y *2*. The authors of (2000Lu17) recommend using the day as the time unit since it is

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Adopted Levels (continued)

^{3}H Levels (continued)

E(level)	J^{π}	$T_{1/2}$	XREF	Comments
				exactly defined in terms of the second. The same data were reanalyzed using a different method as reported in (2006Ma57) resulting in $T_{1/2}$=4497 d *4* or 12.31 y *1*.