Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, G. C. Sheu	ENSDF	16-Jan-2018

Q(β^-)=−18.7×10^3 *10*; S(n)=15558 *20*; S(p)=1469 *8*; Q(α)=−9040 *10* 2017Wa10

Theoretical analyses of ^{17}Ne.

Nuclear Mass and Level Properties:

General analyses of the ^{17}Ne nuclear properties are given in (1973Re17,1978Gu10,2004Ge02,2018Fo04). Comparisons of the ^{17}Ne level properties with those of levels in the ^{17}N mirror nucleus are found in (1996Ti02, 2004Ga07,2006Fo08,2006Li18,2018Fo02).

Halo Character.

Because of the unbound nature of ^{16}F, the nucleus ^{17}Ne is considered a Borromean nuclear system similar to ^{6,8}He and ^{11}Li. The low binding energy suggests the ground or first excited states may exibit properties that can be described as a ^{15}O core surrounded by a diffuse 2-proton halo. Detailed studies on ^{17}Ne are found in (1990Ha29, 1995Zh35, 1997Li22, 1998Na01, 2001Fo05, 2003Zh29, 2004Ta40, 2005Gr11, 2008Ne13, 2013Zh27, 2016Hw01). More general analyses of one- and two- nucleon halo nuclides, including ^{17}Ne, are given in (1994Fe01, 1995Ta06, 1999Kn04, 2001Oz04, 2002Gu10, 2007Be58, 2011Al11, 2014Ch39, 2017Ah08).

Possible soft dipole excitations and pygme dipole resonances are discussed in (2011Ol01, 2012Ma12, 2017Lv02).

3-Body nature of ^{17}Ne.

Studies of the 2-proton correlations associated with the 3-body nature of ^{17}Ne are given in (2001Gr29, 2003Gr01, 2004Ga10, 2005Ga04, 2005Ga49, 2005Pf01, 2005Pf02, 2007Gr12, 2007Gr13, 2010Oi01).

The ^{15}O+2p resonances of ^{17}Ne are relevant for the 2p capture rate on ^{15}O, see (2006Gr20,2016Ca38). The Γ_{2p} width of the E_x=1288 keV: J^π=3/2$^-$ state is of particular interest (2000Gr16) since it is bound to one proton emission, unbound to 2p emission, but γ decays 100%.

3-body nature of ^{19}Mg.

Some states in ^{17}Ne are important for the 2p decay of ^{19}Mg and the 2p+^{17}Ne system, see (2001Mu23, 2003Gr04, 2003Gr24). See other results in (2000Gr18, 2004Pf02, 2007Fo07, 2010Gr06, 2013Ol02, 2017Go17, 2017Kw01).

β-decay studies.

The β decay of ^{17}Ne is rather complex. The first forbidden decay to ^{17}F is stronger than expected (1972To03, 1994Jo04, 1997Mi08, 1999Ba21, 2000Ni14, 2003Sm02); the observation may be connected with the halo nature of ^{17}Ne. See other general analyses and comparison with ^{17}N decay in (1965Ha31, 1970Wi02). The decay is dominated by β-p reactions to levels in ^{16}O (1963Ba63, 1964Da13, 1964Fl03, 1964Mc16, 1965Ha20, 1967Es02, 1988Bo39, 2002Ch61, 2002Mo19). Additional β-α branches to ^{13}C are also present. See theoretical discussion in (1973Ha77, 1977Ce05).

^{17}Ne Levels

Cross Reference (XREF) Flags

A	^{1}H(^{17}Ne,P)	H	^{9}Be(^{18}Ne,^{17}Ne)	O	^{20}Ne(^{3}He,^{6}He)
B	^{1}H(^{17}Ne,^{15}O2p)	I	^{9}Be(^{20}Ne,^{17}Ne)	P	Mgo(p,^{17}Ne)
C	^{1}H(^{18}Ne,D)	J	^{16}O(^{3}He,2n)	Q	Mg(p,^{17}Ne)
D	^{9}Be(^{12}C,X),^{12}C(^{12}C,X)	K	^{16}O(^{14}N,^{13}B)	R	Si(^{17}Ne,X)
E	^{9}Be(^{17}Ne,^{17}Ne′)	L	^{18}Na p decay	S	Ni(^{20}Ne,^{17}Ne)
F	^{9}Be(^{17}Ne,X)	M	^{19}F(p,3n)	T	Au(^{17}Ne,^{17}Ne′γ)
G	^{9}Be,^{12}C,^{27}Al(^{17}Ne,X)	N	^{19}Mg 2p decay:4.0 ps	U	Pb(^{17}Ne,^{17}Ne)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	1/2$^-$	109.2 ms *6*	A CD FG IJ LMNOPQRSTU	%ε+%β^+=100; %εp=95.2 *46* (2002Mo19); %$\varepsilon\alpha$=2.77 *19* (2002Mo19) T=3/2 μ=+0.7873 *14* (2005Ge06) T$_{1/2}$: weighted average of: 109.3 ms *6* (1988Bo39), 109 ms *1* (1971Ha05). Other results can be found in (1967Es02,1967Fi10,1964Mc16) and Hardy, et al., Nucl. Isospin, Proc. 1969 Conf. (Academic Press, 1969) 725.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{17}Ne Levels (continued)

E(level)	J^π	XREF	Comments
			ΔM=16500.4 keV *4*: From ISOLTRAP measurement in (2008Ge07). Note: most level energies are taken from (1998Gu10) who measured ΔM=16453 keV *32*. Since other measurements (2002Ch44,2017Br07) tend to support the level energy differences found in (1998Gu10), those relative level energy spacings are preserved in the present evaluation.
1288 *8*	$(3/2,1/2)^-$	C K O T	%IT=100 (2002Ch44) B(E2)↑=0.0090 *18* (2016Ma42) E(level): From (1998Gu10), also see E_x=1275 keV *22* from (2002Ch44) Au(^{17}Ne,^{17}Ne′). J^π: $3/2^-$ is preferred based on comparison with the ^{17}N levels (1998Gu10). Γ_{2p}/Γ <1.6×10^{-4} (2017Sh29).
1749 *8*	$(5/2,7/2)^-$	E H O TU	%p=100 (2017Br07) J^π: $5/2^-$ is preferred based on comparison with the ^{17}N levels (1998Gu10). E(level): From average of E_x=1764 keV *12* (1998Gu10) and E_x=1745 keV *7* (2018Ch25). Also see E_x=1770 keV *20* from (2017Br07) ^{9}Be(^{17}Ne,^{17}Ne′).
1908 *15*	$1/2^+,(3/2,5/2)^+$	C H K O TU	%p≈100 (2002Ch44) B(E1)↑<0.00007 (2016Ma42) J^π: $1/2^+$ is preferred (1998Gu10). E(level): From (1998Gu10), also see E_x=1900 keV *78* from (2002Ch44) Au(^{17}Ne,^{17}Ne′).
2651 *12*		C E O TU	%p=100 (2016Ma42,2017Br07) J=$5/2^+,5/2^-,3/2^+,7/2^-$ E(level): From (1998Gu10) ^{20}Ne(^{3}He,^{6}He). While only one peak has been observed in the region, the group is suggested as a possible doublet (1998Gu10) since relatively poor energy resolution may conceal two groups. An analysis of the angular distributions for the E_x≈2623 keV region is consistent with L=3 (J^π=$(5/2^-,7/2^-)$), while analysis of the E_x≈2765 keV region is consistent with L=2 (J^π=$(3/2^+,5/2^+)$). A later analysis of Pb(^{17}Ne,^{17}Ne′) (2016Ma42) suggests an unresolved doublet with ^{17}Ne*(2614 keV *20*:$5/2^+$) and ^{17}Ne*(2692 keV *21*:$3/2^-$).
2997 *11*	$(7/2,5/2)^-$	K O T	J^π: $7/2^-$ is preferred based on comparison with the ^{17}N levels (1998Gu10). E(level): From (1998Gu10).
3415 *38*	$(5/2^-)$	U	%p=100 (2016Ma42) E(level),J^π: From (2016Ma42).
3548 *20*	$(9/2,11/2)^-$	E K O T	%p=100 (2016Ma42,2017Br07) J^π: $9/2^-$ is preferred based on comparison with the ^{17}N levels (1998Gu10). E(level): From (1998Gu10).
4010 *10*	$(3/2,5/2)^+$	O T	J^π: $3/2^+$ is preferred based on comparison with the ^{17}N levels (1998Gu10). E(level): From (1998Gu10).
4487 *22*		O T	E(level): From (1998Gu10).
5141 *62*		O TU	E(level): From (1998Gu10), also see E_x=5210 keV *79* from (2016Ma42) Pb(^{17}Ne,^{17}Ne′).
≈5.3×10^3?		K	E(level): From (2000Ol01).
5722 *23*		O T	E(level): From (1998Gu10).
6132 *35*		O T	E(level): From (1998Gu10).
6366 *22*		O T	E(level): From (1998Gu10).
10.06×10^3 *15*		U	E(level): From (2016Ma42).

Adopted Levels, Gammas (continued)

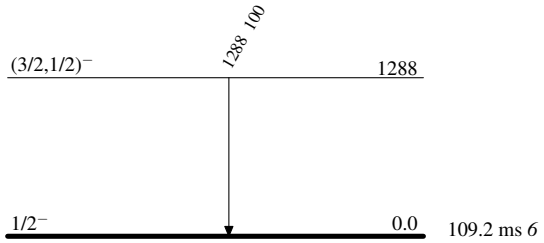
$\gamma(^{17}Ne)$

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
1288	$(3/2,1/2)^-$	1288	100	0.0	$1/2^-$

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{17}_{10}Ne_7$