^{9}Be(α,n),(α,^{12}C) 2011Fr02,2017Ke05

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

1965Li09: ^{9}Be(α,n) E=1.9-4.5 MeV, measured polarization (E,θ).
1966Mi12: ^{9}Be(α,n$_0$) E=5.0-12.0 MeV, ^{9}Be(α,n$_1$) E=4.3-12.0, ^{9}Be(α,n$_2$) E=6.0-10.1, measured σ(E,θ=0°).
1967Ca02: ^{9}Be(α,nγ) E<5.3 MeV, measured E$_\gamma$. ^{12}C deduced levels, T$_{1/2}$.
1968Da05: ^{9}Be(α,n) E=0.34-0.68 MeV, measured σ(E,E$_n$,θ).
1968Le24: ^{9}Be(α,n) E=1-6 MeV, measured σ(E,E$_n$).
1969Kl09: ^{9}Be(α,n) E=1.75,1.96 MeV, measured σ(θ), Q, P(θ).
1969No01: ^{9}Be(α,n) E$_\alpha$<5.48 MeV, measured σ(E$_n$).
1970St16: ^{9}Be(α,n) E=2.4-2.9 MeV, measured P(n) (E,θ).
1970Va23,1973We03: ^{9}Be(α,n) E=1.5-7.8 MeV, measured σ(E,E$_n$,θ).
1972De10: ^{9}Be(α,n) E$_\alpha$ from Po-Be source, measured σ(E$_n$), γn-delay. ^{12}C level deduced neutron decay.
1972Ob01: ^{9}Be(α,n) E=1.69-6.44 MeV, measured σ(E,θ).
1973De14: ^{9}Be(α,n$_0$),(α,n$_1$) E=4.5-5.85 MeV, measured P(E,E$_n$,θ).
1973Lo16: ^{9}Be(α,n), measured E$_n$, I$_n$.
1973Ok06: ^{9}Be(α,n) E=22.9 MeV, measured σ(E$_n$,θ), P(E$_n$,θ).
1974Du12: ^{9}Be(α,n) E=1.95-3.11 MeV, measured P$_n$(θ).
1975Bu09: ^{9}Be(α,n) E=23,25 MeV, measured σ.
1976Ni01: ^{9}Be(α,n) E=2.40-2.80 MeV, measured polarization P(E,θ).
1977Li19: ^{9}Be(α,n) E<7 MeV, analyzed σ(E).
1978Hi06: ^{9}Be(α,n$_0$),(a,n$_1$) E=6.4-6.5 MeV, measured σ(E,θ).
1978Le10: ^{9}Be(α,n) E=100 MeV, measured E$_n$, neutron polarization.
1979Ba48: ^{9}Be(α,n) E=3-7.5 MeV, measured σ.
1981Lo13: ^{9}Be(α,n) E=12,20,24,30 MeV, measured σ(E$_n$), thick target yields.
1983La17: ^{9}Be(α,nγ) E=2.4 MeV, measured E$_\gamma$, I$_\gamma$, thick target γ yields.
1986Ka24: ^{9}Be(α,n) E=Am−Be source, measured E$_\gamma$, I$_\gamma$. ^{12}C level deduced absolute γ-emission rate.
1987Vu02: ^{9}Be(α,n) E≤10 MeV, compiled σ(E), neutron yields.
1989Cr07: ^{9}Be(α,n) E=radioactive source, measured γ yield relative to neutron yield. Deduced neutron intensity calibrated ^{9}Be(α,n) source utility in γ-yield measurements.
1990We10: ^{9}Be(α,n) E=1.9-3.1 MeV, measured σ(θ), polarization.
1992Ki28: ^{9}Be(α,nγ) E=1.9-4.1 MeV, measured σ(θ,n), γ-spectra, I$_\gamma$(θ). Deduced nγ-correlation function.
1993Bo31: ^{9}Be(α,n) E=12.6 MeV, measured neutron spectra, θ=25°. Deduced target average areal density, homogeneity features.
1994Ha32: ^{9}Be(α,n) E=480-740 keV, measured σ(E). Deduced resonance σ, Γ, Tokamak materials study relevance.
1994Wr01: ^{9}Be(α,n) E$_{c.m.}$=0.16-1.87 MeV, measured σ(E), thick target yield.
1996Ku07: ^{9}Be(α,n) E=0.5-3.5 MeV, measured yield, σ(E). Deduced astrophysical S-factor vs E, reaction rate.
2004Mo18: ^{9}Be(α,n) E=spectrum, measured E$_\gamma$, nγ-coin. Deduced γ-ray to neutron emission ratio for Am-Be source.
2007Ma58: ^{9}Be(α,nγ) E=2.27 MeV; measured yields.
2009Gi03,2010Gi07: ^{9}Be(α,nγ)^{12}C E=1.9-4.5 MeV, analyzed experimental data. Deduced angular correlation parameters for σ(θ), σ.
2011Gi05: ^{9}Be(α,nγ) E=0.3-7.9 MeV, measured reaction products. Deduced σ, reaction rate.
2011Fr02: XUNDL dataset compiled by TUNL, 2011.

Measured ^{12}C(α,3α)^{4}He and ^{9}Be(α,3α)n E$_\alpha$=22-30 MeV in search of ^{12}C resonances above E$_x$=7 MeV that could have structures related to the Hoyle state.

α-particles impinged on a 1 mg/cm^2 ^{9}Be target detected coincident 3α events in 5 cm×5 cm array of position sensitive Si strip detectors covering −69°≤θ≤71°.

Analyzed 3α kinematics to determine the ^{12}C excitation energies. The analysis was further constrained to separately consider both, events populating natural parity states involving ^{12}C*→^{8}Be$_{g.s.}$(J$^\pi$=0$^+$)+α and events that excluded ^{12}C*→^{8}Be$_{g.s.}$+α. The excitation spectra in both cases are compared. A state consistent with E$_x$=13.3 MeV *2* and Γ=1.7 MeV *2* was found.

Analysis of the angular correlations from the ^{12}C(α,3α) reaction support J$^\pi$=4$^+$ for the 13.3 MeV state.

Target J$^\pi$=3/2$^-$.

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^{12}C Levels

E(level)	J^{π}	$T_{1/2}$	Comments
0			
4.4×10^{3}		35 fs *4*	$\Gamma_{\gamma}=11.5\times10^{-3}$ eV *+50−32*. $T_{1/2}$: From τ_{m}=50 fs *6* (see unpublished reference in 1975Aj02). See also τ_{m}=57 fs *+23−17* (1966Wa10) and $T_{1/2}\leq$33 fs *7* (1967Ca02).
7.65×10^{3}			$\Gamma_{\pi}/\Gamma=(6.9\pm2.1)\times10^{-6}$ (1959Al97,1960Aj04,1960Al04,1961Ga03).
9.64×10^{3}†			
10.1×10^{3}?			
10.84×10^{3}†			
11.83×10^{3}			
12.71×10^{3}			
13.3×10^{3}† *2*	(4^{+})	1.7 MeV *2*	J^{π}: Analysis of the 3α angular correlations is consistent with $J^{\pi}=4^{+}$. It is suggested that the E_{x}=7.65 MeV(0^{+}), 13.3 MeV(4^{+}) and an unobserved $J^{\pi}=2^{+}$ state near 9.4 MeV form a rotational band (2011Fr02).
14.08×10^{3}†			
$\approx17\times10^{3}$			

† From natural parity states involving ^{12}C*→^{8}Be$_{g.s.}$($J^{\pi}=0^{+}$)+^{4}He.

γ(^{12}C)

E_{γ}	E_{i}(level)	E_{f}	Mult.
4400	4.4×10^{3}	0	E2

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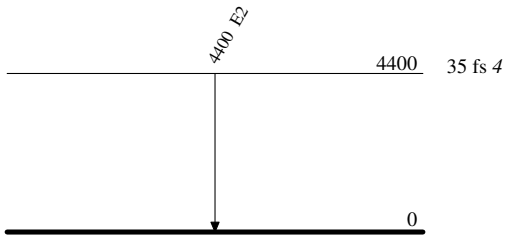
Level Scheme



$^{12}_{6}C_{6}$