^{12}C(d,n)

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, C. G. Sheu and J. E. Purcell	NDS 198,1 (2024)	1-Aug-2024

1948Co24: ^{12}C(d,n) E=12 MeV at the Indiana University cyclotron. Measured β end point and deduced $T_{1/2}$=10.2 min *1*.
1949Gr29: ^{12}C(d,n). Reported states at E_x=2.29 MeV *12*, 3.48 MeV *12* and 3.74 MeV *5*.
1950Ho01: ^{12}C(d,n). Measured β spectrum and end-point energy; deduced $T_{1/2}$=10.05 min *10*.
1953Mi10: ^{12}C(d,n) E=8 MeV; measured $\sigma(\theta)$ for θ=0° to 60°. Deduced ^{13}N*(0,2.38 MeV *5*,3.53 MeV *5*) with L=1, 0 and 2(doublet), respectively.
1955Ma76: ^{12}C(d,n) E≈ 3 MeV; investigated threshold region. Deduced E_x=2.37 MeV *2*.
1955Wi43: ^{12}C(d,n) E≤20 MeV; measured activation cross section. Deduced $T_{1/2}$=10.08 min *4* from analysis of the 14.1 MeV data.
1959El44: ^{12}C(d,n) E=1.45-2.95 MeV; measured $\sigma(\theta)$ for θ=0° to165°.
1957Ca02: ^{12}C(d,n$_{0,1,2+3}$) E=1.45-2.95 MeV; measured $\sigma(\theta)$ for θ<60°. Deduced level energies, L, J^π, $\sigma(\theta$=0), reduced widths.
1957Da08, 1959Da09: ^{12}C(d,n) E=7 MeV; measured β spectrum. Deduced Fierz coefficient, *b*=0.14% *237* and $T_{1/2}$=9.96 min *3*.
1957De22: ^{12}C(p,γ) and (d,n); measured activation cross sections in the few hundred keV range. Deduced $T_{1/2}$=10.02 min *10*.
1960Bu15: ^{12}C(d,n) E=12.9 MeV; measured polarization of neutrons to various states for θ=15°.
1960Ja12: ^{12}C(d,n) measured $T_{1/2}$ of superallowed β emitters. Summarize $T_{1/2}$ early measurements on ^{13}N made between 1939 and 1958. Their work gives $T_{1/2}$=597.9 sec *3*. Measurement carries a significant weight. (German/Heidelberg text).
1961Ja08: ^{12}C(d,n$_0$) E=0.7-1.3 MeV at the Cambridge accelerator. Measured $\sigma(\theta)$ for θ=0° to 150°.
1963Bu24: ^{12}C(d,n) E=12.8 MeV; measured $\sigma(\theta)$ for θ=0° to 150°. Deduced optical model parameters.
1963Ko24: ^{12}C(d,n) measured $\sigma(\theta)$.
1965Ke10: ^{12}C(d,n) E=4,5,6,7,7.5 MeV; measured polarization obserables for θ=20° to 80°.
1966La18: ^{12}C(d,pn) E=5.39 MeV; measured $\sigma(E_p, \theta_n, \theta_p)$ deduced τ≈0.7E−20 sec for states in the region of ^{13}N*(3.5 MeV).
1966Gu04: ^{12}C(d,n$_0$) E_d=2.7-3.2 MeV. Studied ^{14}N resonances.
1966Ho11: ^{12}C(d,n$_{0,1}$) E_d=3.8-5.0 MeV; measured yield curves for θ=5° to 150°.
1966Sa05: ^{12}C(d,n$_0$) E_d=2.8-4.2 MeV; measured $\sigma(\theta)$ and polarization observables for θ=10° to 130°.
1967Fu03: ^{12}C(d,n$_0$) E_d=3.8-4.2 MeV; measured σ(E).
1967Wo07: ^{12}C(d,n) E=0.4-3.0 MeV; measured σ(E).
1968Do09: ^{12}C(d,n) E=5.2-6.2 MeV; measured polarization observables to ^{13}N*(0, 2.37 MeV) for θ=10° to 130°.
1968Ri15: ^{12}C(d,n) E=3.0 MeV; measured $T_{1/2}$=9.963 min *9*.
1969Ch04: ^{12}C(d,n) E=0.5-0.8 MeV; measured $\sigma(\theta)$ for θ=5° to 160°. Deduced optical model parameters.
1970Ga07: ^{12}C(d,n$_0$) E=12, 15 and 17 MeV; measured $\sigma(\theta)$ for θ=30° to 150°; list tabular data. Deduced optical model parameters and spectroscopic factors. Ground state S(12 MeV)=1.35; S(15 MeV)=1.29; S(17 MeV)=0.78.
1970Ba63: ^{12}C(d,n) E=6.4 MeV; measured neutron polarization.
1971Hi09: ^{12}C(d,n$_0$) E=8.5 MeV. Measured neutron polarization for θ=2.5° to 70°.
1971Ja17: ^{12}C(d,n) E=2.17, 2.96 MeV; measured polarization observables at θ=20°.
1971Mu18: ^{12}C(d,n$_{0,1,2+3}$) E=11.8 MeV; measured σ(E,θ) for θ=20° to 170°. Deduced level energies and spectroscopic factors. Tabular data provided.
1973Cl04: ^{12}C(d,n) E=3.3,3.4 MeV; measured $\sigma(E_n)$, deduced $\Gamma(^{13}N^*(2366))$=36.15 keV *54*. Discussed all previous data on Γ(2366); analyzed width dependence on reaction.
1975Ka26:^{12}C(d,n) E=1.86 MeV; measured polarization observables at θ=5°.
1975Az02: ^{12}C(d,n$_{0,1,2+3}$) 15.25 MeV; measured σ(E,θ) for θ=0.3° to 99°.
1975Bo32,1975Bo35: ^{12}C(d,n$_{0,1,2+3}$) E=6.3 MeV; measured σ(E,θ) for θ=0° to 82.5°. Analyzed shape of the ^{13}N*(2364) state.
1976Te03: ^{12}C(d,n$_{0,1}$) E=5.7-9.7 MeV; measured σ(E,θ) and polarization observables over θ=5° to 35°.
1981Li23: ^{12}C(vec d,n$_{0,1}$) E=6-14 MeV; measured θ=0° polarization transfer.
1981Sh22: ^{12}C(d,n$_0$) E=7-10 MeV; measured σ(E,θ=0°): thick target yield.
1984Sc04: ^{12}C(d,n$_{0,1,2+3}$) E=7-13 MeV; measured σ(E,θ) for θ=5° to 160°; deduced optical model parameters and S=0.34 and 0.28 for ^{13}N*(0, 2.36), respectively.
1987Ie02: ^{12}C(d,n$_0$) E=25 MeV; measured polarization observables for θ=10° to 90°.
1987KaZL, 1988Ka30: ^{12}C(d,n$_{0,1}$) E=18 MeV; analyzed Γ(2.36)=54 keV.
1990Mi11: ^{12}C(d,n) E=0.5-6 MeV; measured σ(E) via activation technique.
1991Fi05, 1991Fi11: ^{12}C(d,n) E=1-23 MeV; measured σ(E), thick target.

^{12}C(d,n) (continued)

2020Ge10: ^{12}C(d,n) E=1-12 MeV; measured thick target yields.
2021Su11: ^{12}C(d,n) E≈200 MeV; analyzed neutron energy spectrum.
Theory:
1958Mc63: Analyzed ^{13}C and ^{13}N ground state reduced widths. Found consistency; see additional references within.
1968Ba47: ^{12}C(d,n) E=3-12 MeV; calculated polarization observables.
1972Pe11: Analyzed spectroscopic factors between 4 and 20 MeV.
1974Bo52, 1974Bo53: ^{12}C(d,n); calculated $\sigma(\theta)$.
1978Ba21: ^{12}C(d,$n_{0,1}$) E=6.3 MeV; analyzed resonant and non-resonant σ(E,θ).
1983Mu13: ^{12}C(d,n), (^{3}He,d); analyzed data.
1984Bl21: ^{12}C(d,n); calculated $\sigma(\theta)$.
2015De38: ^{12}C(d,n) 3-body model analysis of (d,n) and (d,p) reactions.
2016Na23, 2016NaZT: ^{12}C(d,n); calculated σ(E), deduced spectroscopic factors.
2016No14: ^{12}C(d,n); calculated σ(E) using TALYS.
2017De20: ^{12}C(d,n); analyzed $\sigma(\theta)$ for E=7, 12, 18 and 25 MeV.
2024Ol01: ^{12}C(d,n); calculated σ(E) for E≤200 MeV and σ(E,θ) for E≤100 MeV and θ=15°, 30°, 45° and 60°. Compared PHITS reaction code with experimantal results.

^{13}N Levels

E(level)†	Jπ†	$T_{1/2}$	L†	S†	Comments
0	1/2$^-$	9.963 min *9*	1	0.74	$T_{1/2}$: From $T_{1/2}$=597.9 s *3* (1960Ja12), $T_{1/2}$=9.963 min *9* (1968Ri15). S: From (1971Mu18). See also S=0.34 (1984Sc04).
2.36×10^3 *2*	1/2$^+$	36.15 keV *54*		1.02	E(level): From (1955Ma76). $T_{1/2}$: $\Gamma_{c.m.}$ from 1973Cl04. S: From (1971Mu18). See also S=0.25 (1984Sc04).
3.51×10^3	(3/2$^-$)			0.13	E(level): Doublet (1966La18).
3.55×10^3	(5/2$^+$)			0.87	E(level): Doublet (1966La18).

† From DWBA analysis of spectroscopic factors in (1971Mu18).