^{12}C(d,p),(d,pγ)

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

1951St19: ^{12}C(d,p); the Q-value (2716 keV *5*) is determined.
1951Va09: ^{12}C(d,p), E=1.51, 1.80 MeV; deduced E_x=3686 keV *11*.
1952Th24: ^{12}C(d,p),(d,pγ) E=1-2 MeV; deduced E_γ=3082 keV *7* after correcting for doppler broadening, from the positron spectrum of internal conversion pairs.
1954Fr24: ^{12}C(d,p) E=19 MeV; measured d$\sigma(\theta)$ to ^{13}C*(0, 3.08, 3.89 MeV): $\theta_{c.m.}$=20° to 160°, deduced L, J.
1954Ho48: ^{12}C(d,p) E=3.29 MeV; measured differential cross sections ar θ=5°−140°.
1955Be62: ^{12}C(d,p) E=4.0 MeV; E_γ=3.74 MeV *3* and 3.84 MeV *3* were observed.
1954Sp01: ^{12}C(d,p); four Q-values are determined corresponding to ^{13}C*(0,3.090,3.684,3.855) with error range from 10 keV for the g.s. to 7 keV for the 3.855 state. The spacing between 3.684 and 3.855 level is 170 keV *3*.
1955Kh35: ^{12}C(d,p) E=3.76 MeV; ^{13}C*(0,3.10,3.69.3.86) investegated; errors ±10-15 keV.
1955Mc75: ^{12}C(d,p) E=14.8 MeV; measured yields for θ=9.8°−86.6°. Observed 11 excited states at ^{13}C*(0, 3.09, 3.68, 3.86, 6.87, 7.47, 7.53, 7.64, 8.4, 9.5, 9.90, 10.76 MeV), deduced L, J.
1956Do41: ^{12}C(d,p); measured the reaction energies; Q=−0.960 MeV *2* and −1.130 MeV *2* for ^{13}C*(3.68,3.86), respectively.
1956Gr37: ^{12}C(d,p); measured angular distributions of protons to ^{13}C*(0, 3.09, 3.68, 3.85): $\theta_{c.m.}\approx$5°−45°. Deduced L, J.
1956Ma52: A scintillation spectrometer and a magnetic lens spectrometer have been used to study γ rays from excited states of ^{13}C at 3.84 and 3.68 MeV, produced in the reactions ^{12}C(d,p) and ^{10}B(α,p). Transition energies have been measured as 169.5 keV *4*, 3.844 MeV *15*, and 3.69 MeV *2*. The internal conversion coefficient for the 170 keV γ ray is Y_e/Y_γ=1.4×10^{-4} *3*. Lastly, γ decay branching ratios were deduced for ^{13}C*(3.84).
1958Bo67,1958He47,1958Hi74,1958Ju39,1958Ju42: ^{12}C(vec(d),vec(p)), measured analyzing powers to ^{13}C*(0, 3.09, 3.86).
1958He47: ^{12}C(vec(d),vec(p)) E=7.8 MeV; measured analyzing powers to ^{13}C*(0, 3.09).
1958Mc63: ^{12}C(d,p) E_d(res)=2.502 and 2.735 MeV; angular distributions are analyzed to obtain the reduced neutron widths of ^{13}C*(0,3.09) states. Deduced reduced widths θ^2_n.
1959Ha29,1961Ha19: ^{12}C(d,p) E=10.2,12.4,14.8 MeV; angular distributions to the ^{13}C*(0, 3.09) states were obtained for $\theta_{c.m.}\approx$10°−90°. Deduced L, g.s. reduced width θ^2_n.
1960Al35: ^{12}C(d,p); measured angular distributions.
1960Ch01,1960Ch12: ^{12}C(d,$p_3\gamma$) E=1.7-3.1 MeV; the cross section was obtained from the yield of the 170 keV γ-ray, transition of ^{13}C*(3.85 MeV:5/2$^+$)→^{13}C*(3.68 MeV:3/2$^-$).
1960Mo05: ^{12}C(d,p_{0-3}) E=14.9-19.6 MeV; measured angular distributions for θ=15°−165°. Deduced g.s. radius.
1960Za04,1960Za06: ^{12}C(d,p_{0-3}) E=4.7-13.3 MeV; measured angular distributions.
1961Go29: ^{12}C(d,p); measured the γ-ray energies for ^{13}C*(3.09,3.68,3.86) with ≈15 keV resolution.
1961Ja23: ^{12}C(d,p); reported Q_0=2725 keV *5* and E_x= 3093 keV *6* for the first excited state.
1962Fl06: ^{12}C(d,pγ) E=2.80,3.23,3.70 MeV; measured p-$\gamma_{2,3}$ angular correlations at reaction angles near the stripping maximum. Tentative multipole mixtures assigned are Γ(E2)/$\Gamma_\gamma\leq$ 5% for the E_γ=3.68 MeV and Γ(E3)/$\Gamma_\gamma\leq$ 2% for the E_γ=3.85 MeV.
1962Si08: ^{2}H(^{12}C,pγ) E=14 MeV; measured τ_m=7.5 $^{+3}_{-2}$ ps for ^{13}C*(3.85) using DSAM. Deduced the transition strengths of the competing decay modes.
1962Sl04: ^{12}C(d,$p_{0,2}$) E=27.7 MeV; measured angular distributions for $\theta\approx$20°−100°, deduced L.
1962Zh01: ^{12}C(d,$p_{0,1}$) E=6.6 MeV; measured angular distributions for $\theta\approx$20°−80°.
1963Ev04: ^{12}C(d,$p_{0,1}$), 5.5<E<12 MeV; measured angular distributions for ^{13}C*(0, 3.09) at $\theta\approx$10°−120°, proton polarization for ^{13}C*(3.09) and p-γ correlations for ^{13}C*(3.09, 3.68, 3.85).
1963Li09: ^{12}C(d,$p_{0,1}\gamma$) E=6.03 MeV; measured angular correlation function for $\theta\approx$20°−160°.
1963Pi04: ^{12}C(d,pn) E=4.66,4.90,5.46 MeV; searched for sequential 3-body breakup states; no evidence was observed for involvement of ^{13}C. See also (1968Bo02, 1973Sa03).
1963Va23: ^{12}C(d,$p_{0,1}$) E=25.9 MeV; measured absolute differential cross sections $\theta_{c.m.}\approx$5°−70° and 30°−140°, respectively.
1964Sc12: ^{12}C(d,$p_{0,1}$) E=11.8 MeV; measured the angular distributions of protons at θ=10°−165°. Deduced the reduced widths θ^2.
1964Wa05: ^{12}C(d,p); measured not abstracted; deduced nuclear properties.
1965Fi05: ^{12}C(d,p_{0-3}) E=1.7,2.7,3.1,4.0 MeV.
1965Wa16: ^{12}C(d,p); ^{13}C*(3.09,3.68,3.85)→0 transitions observed.
1965Wi11: ^{12}C(d,p_0) E=0.717-1.740 MeV; measured σ(E;θ) for $\theta_{c.m.}\approx$5°−165°.
1966Be31: ^{12}C(d,pγ), ^{13}C; measured p-γ angular correlation functions.

^{12}C(d,p),(d,pγ) (continued)

1966Ga09: ^{12}C(d,p_0) E=1.2-4.5 MeV; measured σ(Ep,θ). ^{13}C deduced S-factors.
1966Ge03: ^{12}C(d,$p_{2,3}\gamma$) E=2.80,3.23,3.70 MeV; measured σ(Ep,θ), $\sigma(\theta)$, $\theta_{c.m.}\approx 20°-160°$; deduced θ^2, S-factors.
1966Gl01: ^{12}C(d,p0-3) E=8,12 MeV; measured σ(Ep,θ). ^{13}C deduced levels, L, J^π, S-factors, reduced width.
1966Go15: ^{12}C(d,pγ); inconclusive results on mixing ratios are found from p-γ angular-correlation measurements, measured ^{13}C*(3.85) γ branching ratio.
1966Ka05: ^{12}C(d,pγ) E=2.0-3.2 MeV; measured σ(E;Ep,θp,θpγ) for $\theta_{c.m.}\approx 30°$ to 125°; analyzed p-γ angular correlations, deduced reduced widths, J, π.
1966Kl05: ^{12}C(d,$p_{0,1}$) E=0.9-1.75 MeV; measured angular distributions.
1966Ma25: ^{12}C(pol. d,p); analyzed the asymmetry in the proton angular distributions.
1966Po11: ^{12}C(d,pγ) E=2.51 MeV; measured γ-γ coinc. from ^{13}C*(3.85 MeV); deduced mixing ratios for 3.68→0 and 3.85→0.
1966Sc09: ^{12}C(d,p_{0-3}) E=11,13 MeV; measured angular distributions for $\theta_{c.m.}\approx 10°-160°$, analyzed J.
1967Au05: ^{12}C(d,p_0) E=63 MeV; measured σ=65 mb *5*.
1967Me02: ^{12}C(d,p) E=2.72, 2.8 MeV; measured τ=55 fs *6* for ^{13}C*(3.09).
1967Od01: ^{12}C(d,p), measured Q_0=2.7223 MeV *61*.
1967Po01: ^{12}C(d,$p_{0,1}$) E=0.9-2.1 MeV; measured σ(Ep,θ) for $\theta_{c.m.}\approx 20°-160°$. Deduced reduced widths, S-factors, L(n), π.
1967Sc29: ^{12}C(d,$p_{0,2}$) E=12 MeV; angular distributions (d$\sigma(\theta)$) for $\theta_{c.m.}\approx 15°-175°$, deduced S-factors.
1968Al03: ^{12}C(d,p), E(^{12}C)=15.0 MeV; measured τ_m<15 fs for ^{13}C*(3.09).
1968Co04: ^{12}C(d,p) E=4.66 MeV; measured $\sigma(\theta=70°)$.
1968Go14: ^{12}C(d,pγ); measured polarization of 170 keV γ rays.
1968Ho23: ^{12}C(d,p_{0-11}) E=12.3-14.7 MeV; measured σ(Ep,θ) for θ=20° to 60°; deduced reaction mechanism.
1968Ri16: ^{12}C(d,p) E=1.79, 2.715, 3.60 MeV; measured $T_{1/2}$<10 fs and <26 fs for ^{13}C*(3.08,3.68) via DSAM.
1968Yu01: ^{12}C(pol. d,$p_{0,1}$) E=8 MeV; measured vector analyzing powers for $\theta\approx 10°-120°$.
1969Al17: ^{12}C(d,p) E=3.25 MeV; measured E_γ=169.25 keV *4* for ^{13}C*(3.85→3.68).
1969Bo32: ^{12}C(d,p_0) E=0.9-2.0 MeV; measured σ(E), σ(E;Ep,θ) for θ=20°−140°.
1969Co02: ^{12}C(d,p_{0-3}) E=5-10 MeV; measured σ(E,θ), σ(E;Ep,θ) for θ=30°−160°.
1969Cu10: ^{12}C(pol. d,p) E=7.7-10 MeV; measured vector analyzing power for θ=20°−170°.
1969Gu02: ^{12}C(d,p_0) E=4.5 MeV; measured σ(Ep,θ), P(θ) for $\theta\approx 10°-165°$; deduced optical parameters.
1969So07: ^{12}C(d,p) E=2.9,3.07,3.25 MeV; measured proton polarization(E,θ) for θ=30°−120°.
1970Al26: ^{12}C(d,p_0) E=1.4-2.3 MeV; measured σ(E;θ) for θ=25°−160°.
1970Bo20: ^{12}C(pol. d,p) E=1.4-2.4 MeV; measured proton polarization, determined sign, compared with (pol. d,n).
1970Ho37: ^{12}C(d,p) E=14.6 MeV; measured σ(Ep); deduced phase shifts, levels up to E_x=9.90 MeV.
1970Le20: ^{12}C(d,p_0) E=3.31-3.69 MeV; measured σ(E;θ) for $\theta_{c.m.}$=10°−170°.
1970Za10: ^{12}C(d,p) E=12.8 MeV; measured σ(Ep).
1971Bo44: ^{12}C(d,p) E=2.7-3.1 MeV; measured vector analyzing power(E;θ).
1971Br44: ^{12}C(d,p_0) E=12.3 MeV; measured tensor analyzing power(θ) for θ=0°−50°.
1971Bu03: ^{12}C(pol. d,$p_{0,1}$) E=12.35 MeV; measured $\sigma(\theta)$, proton analyzing powers, θ=20°−136°. DWBA analysis.
1971Du09: ^{12}C(d,$p_{0,1,3}$) E=80 MeV; measured $\sigma(\theta)$ for θ=15°−50°; deduced optical potentials, S-factors.
1971Pu01: ^{12}C(d,p_0) E=0.4-0.85 MeV; measured σ(E;θ) for $\theta\approx 30°-150°$; deduced optical-model parameters, deduced S-factors.
1972Bl04: ^{12}C(pol. d,p) E=4-6 MeV; measured proton analyzing powers for θ=10°−135°, deduced minimal influence from compound-nucleus resonance.
1972Bo56: ^{12}C(pol. d,$p_{0,1}$) E=1.6-3.0 MeV; measured σ(Ep,θ), vector analyzing power(90°); analyzed reaction mechanism.
1972Hu13: ^{12}C(d,p_0) E=0.4-1.35 MeV; measured σ(E;θ) for θ=80°−160°.
1972Ma77: ^{12}C(pol. d,p) E=1.9-3.0 MeV; measured vector analyzing power A(E,θ), analyzed reaction mechanism.
1972Pe11: ^{12}C(pol. d,p) E=4-21 MeV; analyzed $\sigma(\theta)$ for θ=20°−160°, deduced S-factors.
1972SaYS: ^{12}C(d,p) E=4.04 MeV; measured $\sigma(\theta)$.
1973Be25: ^{12}C(d,p_{0-3}) E=2.5, 2.72 MeV; measured $\sigma(\theta)$, deduced S-factors.
1973Da17: ^{12}C(pol. d,$p_{0-4,8-11}$) E=9.3,13.3,15.0 MeV; measured polarization parameters iT_{11}(Ed,Ep,θ), cross sections σ(Ed,Ep,θ) for θ=20°−150°, deduced S-factors, resonance widths.
1973Go02: ^{12}C(d,pγ) E=4.15 MeV; measured p$\gamma(\theta)$ angular correlations, deduced mixing ratio for ^{13}C*(3.68→0).
1973Go03: ^{12}C(d,p) E=14.0-15.5 MeV; measured σ(E;Ep;θ) for θ=60°−120°, deduced levels, level-width for E_x=10.8-12.1 MeV.
1973HaVB: ^{12}C(d,p), measured $\sigma(\theta)$.
1973Jo10: ^{12}C(pol. d,p_0) E=12.3 MeV; measured analyzing powers $iT_{11}(\theta)$, $T_{20}(\theta)$, $T_{22}(\theta)$ for θ=0°−50°, analyzed reaction

^{12}C(d,p),(d,pγ) (continued)

mechanism and deduced importance of deuteron d-state effects.

1973Le26: ^{12}C(d,p_0) E=1.13,1.17 MeV; measured σ(E,θ), P(E,θ).

1973Me22: ^{12}C(pol. d,p) E=5-12 MeV; measured T_{20}(E;θ) for θ=0°−15°; analyzed importance of deuteron d-state effects.

1973Tr02, 1973TrZP: ^{12}C(d,$p_1\gamma$) E=0.8-2.1 MeV; measured σ(E); analyzed γ-ray lines shape; deduced $\sigma(\theta)$, resonance interference.

1974Be48: ^{2}H(^{12}C,pγ) E=15 MeV; measured p$\gamma(\theta)$, DSA, p$\gamma(\theta$,t). Deduced ^{13}C*(3.85 MeV) g=0.59 *5* via time-differential recoil-in-vacuum, τ_m=12.4 ps *8* δ(E3/M2)=+0.12 *4*. See also (1973RaZH).

1974Da06: ^{12}C(d,p_{0-3}) E=2.61-2.82 MeV; measured σ(E,Ep,θ(p)) for θ=10°−160°; deduced levels, L(n).

1974Gm01: ^{12}C(d,$p_{0,1,2}$) E=1.82-2.50 MeV; measured σ(E,Ep,θ). ^{13}C levels deduced S-factors.

1974Jo14: ^{12}C(d,p); measured Q=2721.9 keV *8*.

1975Ra29: ^{12}C(d,pγ) E=2.51 MeV; measured $E_\gamma(\theta(\gamma)=0°)$ Doppler shift, recoil distance. Deduced τ_m(3.85)=13.0 ps *4*.

1975Tr07: ^{12}C(d,pγ) E=1.4-3.2 MeV; measured $\sigma(E,E_\gamma)$; deduced σ(E,Ep,θ), levels energies up to E_x=3854, γ-branching.

1975ZaZS: ^{12}C(d,p) E=13.6 MeV; measured $\sigma(\theta)$.

1976Dy05: ^{2}H(^{12}C,pγ) E=15.5 MeV; measured spin precession of ^{13}C*(3.85), deduced transient magnetic field in Fe.

1977AnZO: ^{12}C(d,p) E<1.4 MeV; measured absolute σ(E,θ).

1977Ba39: ^{12}C(pol. d,p) E=12.3 MeV; measured T_{20}, T_{22}; analyzed importance of deuteron D-state, deduced J-mixing ratio.

1977He12: ^{2}H(^{12}C,pγ) E=15 MeV; measured γ-ray Doppler patterns. Deduced τ_m of ^{13}C*(3.85)=12.6 ps *3*.

1977Ta08: ^{12}C(d,p_{0-7}) E=9.0 MeV; measured $\sigma(\theta)$ for $\theta\approx$30°−170° with an emphasis on ^{13}C*(6.864($5/2^+$),7.677($3/2^+$)). Deduced J^π, Γ, S-factors; DWBA analysis.

1979Dy05: ^{2}H(^{12}C,pγ) E=15.5,33 MeV; measured $\gamma(\theta$,H), E_γ, I_γ.

1979Os11: ^{12}C(d,p_1) E=1.5-3 MeV; measured σ(E,θ) $\theta\approx$60°−160°. Analyzed reaction mechanism.

1979Si07: ^{12}C(vec. d,p) E=2.34-2.74 MeV; measured P(θ); deduced spin-orbit potential parameters.

1979Wa24: ^{12}C(d,p) E=9 MeV; measured $\sigma(\theta)$. Optical model, zero-range DWBA, Hauser-Feshbach analyses.

1980Wa24: ^{12}C(d,p) E=2.51 MeV; measured E_γ, I_γ, $\gamma\gamma$-coin, $\gamma(\theta)$. Deduced Eγ, level energies, γ-branching. Analyzed $T_{1/2}$, compared trensition strengths via shell model.

1981Ru04: ^{2}H(^{12}C,p) E=15 MeV; measured p$\gamma(\theta)$, recoil. For ^{13}C*(3.85) deduced g=0.558 *15* and τ_m=12.2 ps *4*. Enriched target, recoil into vacuum, plunger technique. This gives μ=1.40 *4* (2011StZZ).

1982Sa29: ^{12}C(d,p) E=9 MeV; measured $\sigma(\theta$,Ep). Deduced possible excitation of ^{13}C*(8.2 MeV:$3/2^+$) state.

1984Ha26: ^{12}C(pol. d,p_{0-3}) E=56 MeV; measured $\sigma(\theta)$, A(θ) for θ=10°−70°. Deduced S-factors. DWBA, adiabatic model analyses.

1986Oh01: ^{12}C(d,p) E=30 MeV; measured $\sigma(\theta)$ for θ=10°−85°. Deduced Γ, S-factors, shell model configurations for positive parity states below 10 MeV. CCBA, DWBA analysis.

1988La03: ^{12}C(pol. d,p_{0-7}) E=12 MeV; measured $\sigma(\theta)$, i$T_{11}(\theta)$, $T_{20}(\theta)$, $T_{21}(\theta)$, $T_{22}(\theta)$ for θ=15°−85°. Deduced S-factors. DWBA analysis.

1989Ie01: ^{12}C(pol. d,pX) E=65 MeV; measured $\sigma(\theta$p,Ep), analyzed polarization transfer coefficient vs θ and reaction mechanism.

1990Pi05: ^{12}C(d,p) E=12.3 MeV; measured $\sigma(\theta)$ for θ=0°−90°, deduced Q=2721.803 keV *38* and E_x for (d,p_{1-4}) reactions with ΔE≈0.06-0.5 keV.

1991Le36: ^{12}C(d,p) E=735 keV-1.1 MeV; measured products, deduced $\sigma(\theta)$ at θ=150°.

1991We09: ^{2}H(^{12}C,p) E=6-9 MeV; measured $\sigma(\theta$=120°) vs E. High sensitivity analysis method.

1992Na17: ^{12}C(d,p_0) E=160-300 keV; measured $\sigma(\theta)$ for θ=25°−140°.

1993Qu04: ^{12}C(d,p) E=968 keV; measured $\sigma(\theta)$ for θ=10°, 20° and 30°.

1997Pa43: ^{12}C(d,pγ) E=0.5-4 MeV; measured $\sigma(E_\gamma)$ for θ=170°; deduced excitation function.

1999Al49: ^{12}C(d,p) E=223,250,308,332 keV; measured $\sigma(\theta)$ for θ=40°−160°.

2000El08: ^{12}C(d,pγ) E=0.7-3.4 MeV; measured Eγ, I_γ at θ=135°; deduced thick target γ-ray yields.

2001Im02: ^{12}C(d,p) E=11.8 MeV; measured $\sigma(\theta)$, deduced S-factors, asymptotic normalization coefficient for ^{13}C*(3.089 MeV).

2001Li45,2001Li55,2002ZhZZ: ^{12}C(d,p) E=11.8 MeV; measured σ(E,θ) for $\theta\approx$5°−140°. deduced ground and excited state asymptotic normalization coefficients, radii, halo features. Finite-range DWBA calculations.

2004Ch69: ^{2}H(^{12}C,p) E=20, 24 MeV; measured reaction products, Ep, Ip, thick target.

2004Ji10: ^{12}C(d,p) E<3 MeV; measured Ep, Ip; deduced σ, $\sigma(\theta$=150°). Compared with available data.

2006Ko23: ^{12}C(d,p) E=900-2000 keV; measured $\sigma(\theta)$. Comparison with previous results.

2007Ko02: ^{12}C(d,p_{0-3}) E=900-2000 keV; measured Ep, σ(E,θ) for θ=135°−170°.

2008Ja07, 2008Ki17: ^{12}C(pol. d,$p_{0,1,2+3}$) E=140,200,270 MeV; measured analyzing powers. Investigated deuterium spin structure. Compared results to model predictions.

^{12}C(d,p),(d,pγ) (continued)

2008Pa09: ^{12}C(d,p_0) E=0.81-2.07 MeV; measured $\sigma(\theta)$ for θ=135°, 160°.
2014Cs03,2016Cs02: ^{12}C(d,pγ),(d,p) E<2 MeV; measured reaction products, E_γ, I_γ; deduced σ, $\sigma(\theta$=55°).
2022Ho18: ^{2}H(^{12}C,p_{0-3}) E=111.4 MeV; measured reaction in inverse kinematics at TRIUMF/ISAC-II to validate experimental proceedures.

Theory:
1969Pe09: ^{12}C(d,p) E=7.26 MeV; calculated $\sigma(\theta)$, P(θ), vector analyzing power (θ).
1970Do10: ^{12}C(d,p_0) E=12,15,26 MeV; analyzed $\sigma(\theta)$. Deduced S-factors. Absorption model.
1970Oh06: ^{12}C(d,p) E=12 MeV; calculated $\sigma(\theta)$. Coupled channel theory.
1971BrYP: ^{12}C(d,p) E=15 MeV; calculated $\sigma(\theta)$. Analyzed quasi-bound states, intermediate structure.
1972Go08: ^{12}C(d,p_0) E=51 MeV; calculated $\sigma(\theta)$, P(θ). Sudden approximation.
1973Co23: ^{12}C(d,p); calculated σ(E).
1973Co27: ^{12}C(d,p); calculated, level energies.
1973CoYL: ^{12}C(d,p); calculated σ(E). ^{13}C deduced transitions.
1974St05: ^{12}C(d,p); calculated σ(E,Ep,θ). Deduced second-order process contributions.
1975Gr12: ^{12}C(d,p) E=12 MeV; calculated σ(Ep,θ), sudden approximation.
1975Hu01: ^{12}C(d,p) E=8-10 MeV; calculated σ.
1975Is03: ^{12}C(d,p) E=2.8 MeV; calculated σ(Ep,θ).
1975Se07: ^{12}C(pol. d,p), analyzed data; deduced criteria for simplified polarization measurement analysis.
1975Za06: ^{12}C(d,p); analyzed data; deduced σ dependence on J.
1976He17: ^{12}C(d,p) E≤20 MeV; calculated σ(Ep,θ).
1976Os07: ^{12}C(d,p); sub-Coulomb energy stripping; calculated σ for ^{13}C*(3.09), deduced S-factors .
1976Sa04: ^{12}C(pol. d,p) E=6-13.3 MeV; calculated A(θ). Surface reaction model.
1976Sh13: ^{12}C(d,p) E=6-15 MeV; calculated $\sigma(\theta)$.
1977Se09: ^{12}C(pol. d,p); calculated A(θ).
1982Go05: ^{12}C(d,p) E=12 MeV; analyzed data. Deduced S-factors. DWBA, nuclear vertex constants.
1982Ta19: ^{12}C(pol. d,p) E=9, 15 MeV; analyzed $\sigma(\theta)$, $A_y(\theta)$. Deduced Γ. Core excitation, CCBA analysis.
1982Th06: ^{12}C(d,p) E=2.2,2.71 MeV; calculated channel nonorthogonality effects.
1984Bl21: ^{12}C(d,p) E=12 MeV; calculated $\sigma(\theta)$.
1984PeZW: ^{12}C(d,p) E=17.7 MeV; analyzed S-factor data.
1996Ma36: ^{12}C(d,p) E=12 MeV; calculated $\sigma(\theta)$; analyzed 2- and 3-body interaction features.
1998Ko11: ^{12}C(pol. d,p), E at 9.1 GeV/c; analyzed $\sigma(\theta)$, $T_{20}(\theta)$, polarization transfer; deduced multiple scattering role.
2003Li50: ^{12}C(d,p) E=11.8 MeV; analyzed data; deduced asymptotic normalization coefficients. See also (2001Kr12, 2001Nu03).
2004Ke08: ^{12}C(d,p) E=15,30 MeV; calculated $\sigma(\theta)$. Comparisons with data.
2004Li41: ^{12}C(d,p) E=4-56 MeV; analyzed $\sigma(\theta)$, S- factors. Johnson-Soper adiabatic and distorted-wave theories.
2005De33: ^{12}C(d,p) E=7-60 MeV; calculated $\sigma(\theta)$, σ; deduced reaction mechanism features. Coupled-channels approach.
2005Mu24: ^{12}C(d,p) E=51 MeV; analyzed data; deduced S-factors.
2005Ts03: ^{12}C(d,p). Survey of ground state neutron spectroscopic factors from (d,p) and (p,d) reactions.
2007Al28: ^{12}C(d,p) E=4.66,15,56 MeV; calculated σ and A_y within few-body framework.
2009De02: ^{12}C(d,p) E=30 MeV; calculated $\sigma(\theta)$, binding energies. Momentum-space three-body Fadeev-like equations. Comparison with experimental data.
2009De07: ^{12}C(d,p) E=30 MeV; calculated differential cross sections, analyzing powers for polarized beam using local and nonlocal optical potentials parameters in the framework of Faddeev type scattering equations.
2010Ng02: ^{12}C(d,p) E=2-80 MeV; calculated $\sigma(\theta)$ using adiabatic distorted-wave approximation (ADWA) and local energy approximation (LEA). Deuteron breakup and finite range effects.
2011Nu03: ^{12}C(d,p) E=7,12,56 MeV; calculated σ(E,θ) using Faddeev AGS, and finite-range adiabatic wave approximation.
2012Up01: ^{12}C(d,p) E=12,56 MeV; calculated σ(E,θ) for elastic, transfer and breakup channels. Continuum-discretized coupled channels (CDCC) calculations. Comparison with exact three-body Faddeev formulation.
2013Ab06: ^{12}C(d,p) E<2 MeV; analyzed available data; deduced $\sigma(\theta)$, yields. DWBA and R-matrix calculations.
2014Be47: ^{12}C(d,p) E=11.8,25.9,30 MeV; analyzed differential σ(E) data using coupled-reaction-channels method. Deduced S-factors, asymptotic normalization coefficients (ANCs), and rms radii of the last neutron, existence of neutron halos.
2014BeZU: ^{12}C(d,p) E=12,25,30 MeV; calculated, analyzed $\sigma(\theta)$ to the first excited state. Deduced first excited state S-factor, asymptotic normalization coefficients, radii of last neutron, first excited state neutron halo.

^{12}C(d,p),(d,pγ) (continued)

2014Up02: Analyzed screening effects at astrophysical energies.
2015De38: ^{12}C(d,p) E=12 MeV; calculated differential $\sigma(\theta)$. Faddeev-Alt-Grassberger-Sandhas (AGS) formalism with three-body model (proton+neutron+nuclear core) for proton−transfer reactions, and realistic CD Bonn potential.
2015Ke07: ^{12}C(d,p) E=30 MeV; calculated $\sigma(\theta)$ for 9.50-MeV, 9/2$^+$ resonance; deduced best fit spectroscopic amplitudes and corresponding empirical mixing ratios for various state configurations. Coupled reaction channel calculation including the one- and two-step transfer via the ^{12}C 4.44-MeV, 2$^+$ state.
2016Ca20: ^{12}C(d,p) E=56 MeV; calculated $\sigma(\theta$,E), Ep, Ip using the post-form DWBA approximation.
2017Lo02: ^{12}C(d,p) E=11.8 MeV; analyzed differential $\sigma(\theta)$ data using optical potential method,
2018Xu11: ^{12}C(d,p) E=51.93 MeV; analyzed experimental $\sigma(\theta)$ distributions, spectroscopic amplitudes for neutrons in normal and high-lying single-particle components in the ground and excited states. Coupled reaction channel calculations.
2020SaZX: ^{12}C(d,p) E=12 MeV; calculated σ(E,θ). DWBA model. Comparison with experimental data.
2020Vi06: ^{12}C(d,p) E=3.4-25.9 MeV; calculated S-factors. Comparison with available data.
2022Bl04: Discuss method to deduce ANCs from ^{12}C(d,p) measurements.
2023Ga14: Global analysis of optical potential parameters for reactions on A=12-208.

^{13}C Levels

E(level)	J$^\pi$†	T$_{1/2}$ or Γ	L	S†	Comments
0	1/2$^-$		1	0.58 *4*	μ=1.40 *4* (1981Ru04) Q$_0$(keV)=2716 *5* (1951St19), 2721 *2* (1957Va11), 2725 *5* (1961Ja23), 2722.3 *61* (1967Od01), 2721.9 *8* (1974Jo14), 2721.803 *38* (1990Pi05), 2717 *10*(1954Sp01), 2722 (1997Pa43). J$^\pi$: See (1956Gr37, 1962Si08, 1964Sc12, 1966Gl01, 1966Ka05, 1966Po11, 1968Ho23, 1971Du09, 1973Go02, 1974Gm01, 1974St05, 1975Ra29, 1980Wa24, 1986Oh01, 1988La03, 2001Li45, 2002ZhZZ); see also J$^\pi$=1/2 (1968Yu01, 1972Pe11, 1973Jo10, 1973Me22), (1/2$^-$,3/2$^-$) (1955Mc75). L: See (1954Fr24, 1955Mc75, 1956Gr37, 1961Ha19, 1964Sc12, 1966Ka05, 1968Ho23, 1968Yu01, 1972Pe11, 1973Jo10, 1973Me22, 1974Da06, 1974Gm01, 1974St05, 2001Li45, 2002ZhZZ). S: From (1972Pe11); see also S=0.8 (1966Gl01: average), 0.65 (1971Du09), 0.82 (1971Pu01), 1.1 (HD parameters) and 1.4 (MB parameters) (1973Da17), 0.9 (1974Gm01), 0.77 (1986Oh01). ANC=1.93 fm$^{-1/2}$ *17*; R$_{rms}$=3.39 fm *31* (2001Li45, 2001Li55, 2002ZhZZ). θ^2(average)=0.037 *3* (1961Ha19), 0.035 (1964Sc12).
3089.443 *20*	1/2$^+$	<6.93 fs	0	0.36 *2*	Q(keV)=−367.65 *7* (1990Pi05), −366 (1951Va09), −373 *10* (1954Sp01), −368 (1967Po01). E(level): From E$_\gamma$=3089.049 keV *20* measured in (1980Wa24); see also E$_x$=3090 keV *10* (1954Sp01), 3093 keV *6* (1961Ja23), 3088.45 keV *15* (1975Tr07: from E$_\gamma$ measurement, relative to the adopted energy of 3684.15 keV *11* from (1970Aj04)), 3089.39 keV *7* (using Q=−367.65 keV *7* (1990Pi05) and Q$_0$=2721.74 keV from (2017Wa10)), 3100±(10-50) keV (1955Kh35). J$^\pi$: See (1955Mc75, 1956Gr37, 1962Si08, 1964Sc12, 1966Gl01, 1966Ka05, 1968Ho23, 1971Du09, 1973Da17, 1973Tr02, 1974Da06, 1974Gm01, 1974St05, 1975Ra29, 1980Wa24, 1986Oh01, 1988La03, 2001Im02, 2001Li45, 2002ZhZZ); see also J$^\pi$=1/2 (1954Fr24, 1968Yu01, 1972Pe11, 1973Jo10). J$^\pi$: 94.02% 0⊗s$_{1/2}$ (1986Oh01). T$_{1/2}$: from τ<10 fs (1968Ri16); see also τ=55 fs *6* (1967Me02) and <15 fs (1968Al03: corresponds to a ratio of reduced E1 transition strengths in ^{13}C and ^{13}N of greater than 0.06) which is in disagreement with (1967Me02) but is consistent with expectations based on the mean life of the mirror state ^{13}N*(2.37 MeV; 1/2$^+$; radiative width=0.7 eV for E1 transitions to the 3/2$^-$ g.s.). L: See (1954Fr24, 1955Mc75, 1956Gr37, 1961Ha19, 1964Sc12, 1966Ka05, 1967Po01, 1968Ho23, 1968Yu01, 1971Du09, 1972Pe11, 1973Jo10, 1974Da06, 1974Gm01, 1974St05, 2001Li45, 2002ZhZZ). S: From (1972Pe11); see also S=0.9 (1966Gl01: average), 1.1 (HD parameters)

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^{12}C(d,p),(d,pγ) (continued)

^{13}C Levels (continued)

E(level)	J$^{\pi}$†	$T_{1/2}$ or Γ	L	S†	Comments
					and 1.2 (MB parameters) (1973Da17), 0.29 (1974Gm01), 0.65 (1986Oh01), ANC=1.84 fm$^{-1/2}$ *16* (2001Li45, 2001Li55, 2002ZhZZ); see also ANC^2=3.65 fm^{-1} *34*(stat) *35*(syst) (2001Im02) which agrees with (1994Oh02: ^{12}C(n,γ)); R_{rms}=5.04 fm *75* (2001Li45, 2001Li55, 2002ZhZZ). θ^2=0.0157 (1964Sc12).
3684.482 *23*	3/2$^-$	<18 fs	1	0.10	Q=−0.969 MeV *10* (1951Va09), −0.967 MeV *10* (1954Sp01: the spacing between the 3684 and 3855 keV states is 170 keV *3*), −0.960 MeV *2* (1956Do41: the spacing between 3684 and 3855 is 170 keV *15*) and −962.73 keV *6* (1990Pi05). E(level): Derived from γ rays measured in (1980Wa24); see also E_x=3686 keV *11* (1951Va09), 3684 keV *10* (1954Sp01), 3690 keV *15* (1955Kh35: uncertainty is ±10-15 keV), and 3684.47 keV *6* (using Q=−962.73 keV *6* (1990Pi05) and Q_0=2721.74 keV (2017Wa10)). J$^{\pi}$: See (1956Gr37, 1962Si08, 1966Gl01, 1966Ka05, 1966Po11, 1968Ho23, 1973Da17, 1973Go02, 1974Da06, 1974Gm01, 1974St05, 1975Ra29, 1976Dy05, 1980Wa24, 1986Oh01, 1988La03); see also J$^{\pi}$=(1/2$^-$,3/2$^-$) (1955Mc75). $T_{1/2}$: from τ<26 fs (1968Ri16); see also τ<300 fs (1956Ma52). L: See (1955Mc75, 1956Gr37, 1966Ka05, 1974Da06, 1974Gm01, 1974St05). S: HD parameters (1973Da17); see also S=0.09 (1974Gm01), 0.14 (1986Oh01), 0.26 (1966Gl01: average) and 0.20 (1973Da17: MB parameters).
3853.773 *22*	5/2$^+$	8.7 ps *2*	2		Q=−1131.90 keV *20* (1990Pi05), −1130 keV *2* (1956Do41), −1138 keV *10* (1954Sp01). E(level): From γ rays measured in (1980Wa24); see also E_x=3855 keV *7* (1954Sp01), 3860 keV *15* (1955Kh35: E_x uncertainty is ±10-15 keV), 3853.62 keV *15* (1969Al17): deduced by the separation energy between 3.85 and 3.68 states (E_{γ}=169.25 keV *4*; neglect the small recoil energy E_R=1 eV) and the adopted level E_x=3684.37 keV *14* (weighted average of 3684.50 keV *17* (1967Pr10: ^{12}C(n,γ)) and 3684.28 keV *14* (1968Sp01: ^{12}C(n,γ))), 3853.55 keV *15* (1975Tr07: from E_{γ} measurement, relative to the adopted energy of 3684.15 keV *11* from (1970Aj04)), 3853.64 keV *20* (using Q=1131.90 keV *20* (1990Pi05) and Q_0=2721.74 keV from (2017Wa10)). J$^{\pi}$: See (1956Gr37, 1962Si08, 1966Gl01, 1966Ka05, 1966Po11, 1968Ho23, 1971Du09, 1973Da17, 1974Be48, 1974Da06, 1974Gm01, 1974St05, 1975Ra29, 1976Dy05, 1980Wa24, 1981Ru04, 1986Oh01, 1988La03, 2001Li45, 2002ZhZZ); see also J$^{\pi}$=(3/2,5/2) (1954Fr24), (3/2$^+$,5/2$^+$) (1955Mc75). J$^{\pi}$: 78.13% 0⊗$d_{5/2}$ (1986Oh01). $T_{1/2}$: From τ_m=12.55 ps *30* which is the weighted average of ^{12}C(d,p) values: 9.0 ps *+25−15* (1968Ri16), 12.4 ps *8* (1974Be48), 13.0 ps *4* (1975Ra29), 12.6 ps *3* (1977He12) and 12.2 ps *4* (1981Ru04); see also τ=7.5 ps *+3−2* (1962Si08) and 12.5 ps *5*: adopted by (1980Wa24: weighted average of 12.6 ps *7* (1977He12: but using higher uncertainty) and 12.4 ps *6* (weighted average of 10.7 ps *10* (1969He22: ^{10}B(α,p)), 15.4 ps *20* (ref. 5 in 1968Al03, 1968LaZZ), and 9.9 ps *9* (1970Ga01: ^{10}B(α,pγ)))), and see 12.4 ps *8* (1974Be48), 13.0 ps *4* (1975Ra29), >0.3 ps (1956Ma52) and ≥1 ps (2000El08), . L: See (1954Fr24, 1955Mc75, 1956Gr37, 1966Ka05, 1968Ho23, 1974Da06, 1974Gm01, 1974St05, 2001Li45, 2002ZhZZ). S: S=0.8 (1966Gl01: average), 0.7 (1971Du09), 1.1 (HD parameters) and 1.4 (MB parameters) (1973Da17), 0.85 (1974Gm01), 0.58 (1986Oh01). ANC=0.15 fm$^{-1/2}$ *1* (2001Li45,2002ZhZZ), 0.149 fm$^{-1/2}$ *12* (2001Li55); R_{rms}=3.68 fm *40* (2001Li45,2001Li55,2002ZhZZ).
6864.04 *46*	5/2$^+$	6 keV	0,2	0.017	E(level): using Q=−4142.30 keV *46* (1990Pi05) and Q_0=2721.74 keV

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^{12}C(d,p),(d,pγ) (continued)

^{13}C Levels (continued)

E(level)	J$^{\pi\dagger}$	$T_{1/2}$ or Γ	L	S†	Comments
					(2017Wa10). E_x(MeV) also reported at 6.86 (1968Ho23, 1970Ho37), 6.864 (1973Da17, 1986Oh01, 1988La03), 6.868 (1955Mc75), 6.87 (1969Co02, 1971Du09). J$^{\pi}$: See (1968Ho23, 1973Da17, 1986Oh01, 1988La03); see also J$^{\pi}$≤5/2^{+} (1955Mc75). J$^{\pi}$: 67.5% 2⊗$s_{1/2}$, 31.4% 2⊗$d_{5/2}$ (1986Oh01). Γ: from (1977Ta08). L: From (1955Mc75). S: From (1986Oh01); see also S=0.02 (1988La03), 0.04 (1973Da17: HD parameters).
7470 *20*	7/2^{+}				E(level): From (1955Mc75). E_x(MeV) also reported at 7.47 (1968Ho23, 1970Ho37), 7.50 (1969Co02, 1971Du09, 1973Da17), 7.492 (1986Oh01), 7.498 (1988La03). J$^{\pi}$: From (1986Oh01). J$^{\pi}$: 95.11% 2⊗$d_{3/2}$ (1986Oh01).
7533 *20*	5/2^{-}			0.009	E(level): From (1955Mc75). E_x(MeV) also reported at 7.53 (1968Ho23, 1970Ho37), 7.55 (1969Co02, 1971Du09, 1973Da17), 7.547 (1986Oh01, 1988La03). $T_{1/2}$ or Γ: See also Γ≈5 keV (1977Ta08). J$^{\pi}$: See (1968Ho23, 1986Oh01, 1988La03). S: From (1986Oh01); see also S=0.32 (1988La03).
7641 *20*	3/2^{+}	60 keV *13*		0.11	E(level),Γ: from (1955Mc75). E_x(MeV) also reported at 7.64 (1968Ho23, 1970Ho37), 7.68 (1969Co02, 1971Du09, 1973Da17), 7.686 (1986Oh01, 1988La03). Γ: Γ from $Γ_{lab.}$=70 keV *15* (1955Mc75). See also Γ=80 keV (1977Ta08). J$^{\pi}$: See (1968Ho23, 1986Oh01, 1988La03). J$^{\pi}$: 29.7% 0⊗$d_{3/2}$, 68.3% 2⊗$s_{1/2}$ (1986Oh01). S: From (1986Oh01); see also S=0.10 (1988La03).
8.4×10^{3} *3*	3/2^{+}	0.94 MeV *3*	2	1.0	E(level),Γ: from (1955Mc75). E_x(MeV) also reported at 8.33 (1968Ho23, 1970Ho37, 1971Du09), 8.25 (1973Da17), 8.2 MeV (1986Oh01). Γ: Γ from $Γ_{lab.}$=1.1 MeV *3* (1955Mc75). J$^{\pi}$: See (1968Ho23, 1973Da17, 1986Oh01). J$^{\pi}$: 40.0% 0⊗$d_{3/2}$, 37.8% 2⊗$d_{5/2}$ (1986Oh01). L: From (1968Ho23). S: HD parameters (1973Da17).
8858	1/2^{-}			0.5	E(level),J$^{\pi}$: From (1973Da17). E_x(MeV)=8.82 also reported (1968Ho23, 1970Ho37). S: HD parameters (1973Da17).
9500 *20*	9/2^{+}				E(level): From (1955Mc75). E_x(MeV) also reported at 9.50 (1968Ho23, 1970Ho37, 1984Pe24, 1984Pe24, 1986Oh01), 9.51 (1971Du09), 9.499 (1973Da17). J$^{\pi}$: See (1984Pe24,1986Oh01); see also J$^{\pi}$=(3/2^{-}) (1973Da17). J$^{\pi}$: 88.7% 2⊗$d_{5/2}$ (1986Oh01).
9897 *20*	3/2^{-}			0.1	E(level): From (1955Mc75). E_x(MeV) also reported at 9.90 (1968Ho23, 1970Ho37), 9.899 (1973Da17). J$^{\pi}$: From (1973Da17). S: HD parameters (1973Da17).
10755 *5*	7/2^{-}	56 keV *2*		0.026	E(level),Γ: from (1973Go03); E_x was measured with respect to the state E_x=9.499 MeV *4* (1970Aj04). See also E_x=10759 keV *20* (1955Mc75) and 10753 keV (1986Oh01). J$^{\pi}$: From (1986Oh01). S: From (1986Oh01).
10818 *5*		24 keV *3*			E(level),Γ: from (1973Go03). Unresolved E_x=10.81-11.02 MeV also reported in (1971Du09).
10997 *8*		82 keV *15*			E(level),Γ: from (1973Go03).
11080 *5*	1/2^{-}	<8 keV			E(level),Γ: from (1973Go03). E_x=11080 keV also reported in (1986Oh01).

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^{12}C(d,p),(d,pγ) (continued)

^{13}C Levels (continued)

E(level)	$T_{1/2}$ or Γ	Comments
		J^π: From (1986Oh01).
11748 *10*	107 keV *14*	E(level),Γ: from (1973Go03).
11851 *5*	68 keV *4*	E(level),Γ: from (1973Go03).
11970? *40*	≈260 keV	E(level),Γ: from (1973Go03: possibly more than one level). E_x=11970 keV also reported in (1971Du09).
12108 *5*	81 keV *8*	E(level),Γ: from (1973Go03).

† From, for example, DWBA analysis of spectroscopic factors in (1986Oh01).

γ(^{13}C)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	δ	Comments
3089.443	1/2$^+$	3089.049 *20*	100	0	1/2$^-$	E1		E_γ: Measured (1980Wa24); see also E_γ=3082 keV *7* (corrected for Doppler shift) and 3097 keV *5* (uncorrected) (1952Th24), 3110 keV *12* (1961Go29). E_γ also reported in (1960Go19, 1961Go29, 1968Al03, 1995Ro28, 1997Pa43: E_{thres}=428 keV, 2000El08, 2014Cs03, 2014Cs08). I_γ: See (1962Si08,1966Ka05); the absolute E_γ yield is 1.55 *7* (2000El08). Mult.: See (1952Th24,1962Si08, 1966Ka05,1968Al03). Γ_γ>0.066 eV (1968Ri16: Doppler shift).
3684.482	3/2$^-$	595.013	0.75 *4*	3089.443	1/2$^+$	E1		E_γ: From 595.013 keV *11*, which is from the level-energy difference derived from γ rays measured in (1980Wa24). I_γ: From (1980Wa24); see also I_γ=1.6% *3* (1975Tr07), 1% (1966Ka05) and 0.6% (1962Si08). Mult.: See (1962Si08, 1966Ka05).
		3675 *15*	99.25 *4*	0	1/2$^-$	E2+M1	−0.096 *+30−21*	E_γ: From (1956Ma52). See 3683.921 keV *23*, which is from the level-energy difference derived from γ rays measured in (1980Wa24). See also E_γ=3740 keV *30* (1955Be62: corrected for Doppler shift (required)), 3687 keV *15* (1961Go29), 3760 keV *20* (1955Be62: uncorrected), 3690 keV *20* (1956Ma52: uncorrected). E_γ also observed in (1960Go19, 1961Go29, 1962Si08, 1966Ka05, 1966Po11, 1973Go02, 1975Tr07, 1997Pa43: E(thres)=1122 keV, 2000El08, 2014Cs03). I_γ: From (1980Wa24); see also I_γ=98.4% *3* (1975Tr07), 99% (1966Ka05) and 100% (1962Si08).

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^{12}C(d,p),(d,pγ) (continued)

γ(^{13}C) (continued)

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.	δ	Comments
								The absolute E_γ yield is 1.14 *6* (2000El08). Γ_γ>0.025 eV (1968Ri16: Doppler shift). Γ(E2)/Γ_γ</≈5% (1962Fl06). Mult.: See (1962Si08, 1966Ka05, 1966Po11, 1973Go02). δ: From −0.096 *+30−21* (1966Po11). See also δ= −0.154 *54* (1973Go02).
3853.773	5/2$^+$	169.300 *4*	36.3 *6*	3684.482	3/2$^-$	E1		E_γ: Measured (1980Wa24); see also E_γ=169.5 keV *4* (1956Ma52), 169.25 keV *4* (1969Al17: recoil energy E_R=1 eV), 169.3 keV (2000El08), 170 keV (1962Si08, 1966Po11, 1968Go14, 1976Dy05, 1997Pa43). E_γ also reported in (1960Ch01, 1960Ch12, 1966Go15, 1966Ka05, 1975Ra29, 1975Tr07). I_γ: From (1980Wa24); see also I_γ=37% *4* (1966Go15: the γ-ray intensity ratio, (total 3.68)/3.85=0.59 *7*), 36.0% *7* (1975Tr07), 24% *5* (1956Ma52: the γ-ray intensity ratio, (total 3.68)/3.85=0.46), 24% (1962Si08, 1966Ka05, 1966Po11), 30% (1975Ra29). Mult.: See (1962Si08, 1966Ka05). M1 cannot be excluded although the internal conversion coefficient, 1.4×10^{-4} *3*, is consisitent with E1 (1956Ma52). M^2(E1)=0.01 W.u. (1962Si08).
		764.316 *10*	1.20 *4*	3089.443	1/2$^+$	E2		E_γ: Measured (1980Wa24). E_γ also reported in (1962Si08, 1966Go15, 1966Ka05, 1975Ra29, 1975Tr07). I_γ: From (1980Wa24); see also I_γ=0.93% *20* (1962Si08), 0.6% *2* (1975Tr07), 1% (1966Go15, 1966Ka05, 1975Ra29), not detected (1956Ma52: <3%, 1966Po11). Mult.: See (1962Si08, 1966Ka05). M^2(E2)=2.00 W.u. (1962Si08).
		3853.170	62.5 *6*	0	1/2$^-$	E3+M2	+0.12 *3*	E_γ: 3853.170 keV *22*, which is from the level-energy difference derived from γ rays measured in (1980Wa24); see also E_γ=3860 keV *20* (1955Be62: uncorrected for Doppler shift (not required)), 3844 keV *15* (1956Ma52), 3863 keV *15* (1961Go29), 3840 keV *30* (1955Be62: corrected for Doppler shift). E_γ also reported in (1960Go19, 1961Go29, 1962Si08, 1966Go15, 1966Ka05, 1966Po11, 1968Al03, 1974Be48, 1975Ra29, 1975Tr07, 1977He12, 1997Pa43: E(threshold)=1321 keV, 2000El08, 2014Cs03). No γ-rays are observed with E_γ=3.9-5.8 MeV with intensity >10% of the 3.85 MeV γ-ray (1955Be62). I_γ: From (1980Wa24); see also I_γ=62% *4* (1966Go15), 63.4% *8* (1975Tr07), 75% (1962Si08,1966Ka05), 76% (1966Po11) and

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^{12}C(d,p),(d,pγ) (continued)

γ(^{13}C) (continued)

E_i(level)	E_γ	Comments
		69% (1975Ra29). The absolute E_γ yield is 6.92 *4* (2000El08). ω=0.61 rad/ps *5* which leads to the nuclear g-factor=0.59 *5* (1974Be48); see also g-factor=0.558 *15* (1981Ru04) and g-factor=0.60 *5* (1973RaZH). The sign was found to be negative (1976Dy05). M^2(E3)=3.3 *+42−20* single-particle unit or 17.5 W.u. *+225−104* (one standard deviation) (1966Po11), M^2(M2)=0.90 W.u. (1962Si08). M^2(E3)=2.0 *10* single-particle unit (1975Ra29) using Γ(E3,single particle)=2.6×10^{-7} eV (1966Po11). Γ(E3,single particle)=2.6×10^{-7} eV (1966Po11), Γ(E3)=5.2×10^{-7} eV *26* (1975Ra29), Γ(M2)=3.61×10^{-5} eV *23* (1975Ra29) using BR=69% *4* (average value of (1956Ma52,1966Go15) and the mixing ratio E3/M2=+0.12 *3* (1966Po11)). Γ(E3)/Γ_γ</≈2% (1962Fl06). δ: From (1966Po11). β_0=4.40% *5* (1977He12: average). Γ_γ(Doppler shift)=8.8×10^{-5} eV *30* (1962Si08), 4.4×10^{-5} eV *6* (1968Al03): see Table VI in (1968Ri16), 7.3×10^{-5} eV *16* (1968Ri16).

^{12}C(d,p),(d,pγ)

Level Scheme

Intensities: % photon branching from each level