$^{11}B(d,n\gamma)$:res

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

1954Bu06: ^{11}B(d,n) E<2 MeV; angular distributions were measured. The authors suggest that the stripping process plays an important part in the reaction. No narrow resonances were observed in the excitation functions.
1955Ma76: ^{11}B(d,n) E=1.0-5.5 MeV; measured the absolute cross sections for the reaction.
1955Wa30: ^{11}B(d,n) E=600 keV; angular distributions of the neutron groups leading to the ground state and first excited state of ^{12}C, have been determined. For the excited-state group ^{12}C*(4.4), the interpretation is less clear; the observed distribution can be accounted for by p-wave formation of a $J^{\pi}=7/2^{+}$ level in ^{13}C.
1957Am48: ^{11}B(d,n) E=0.5-1.15 MeV; measured angular distributions of the ground-state neutrons from the reaction.
1958Ka31: ^{11}B(d,nγ) E≤3.25 keV; measured σ. ^{13}C deduced resonance parameters at 20.52 MeV (Γ=115 keV *10*) and 21.28 MeV (Γ=160 keV *15*) at 2.180 MeV *10* and 3.080 MeV *15*, respectively.
1961Su17: ^{11}B(d,nγ) E_{γ}=15.1 MeV, E_{d}=1.3-5.6 MeV; deduced σ(E).
1964Ku09: ^{11}B(d,nγ) E_{d}=1.5-5.5 MeV; measured σ. ^{13}C deduced resonance parameters.
1965Al17: ^{11}B(d,nγ) E=1-11 MeV; measured $\sigma(E;E_n,\theta)$. Natural, enriched targets.
1965Cl02: ^{11}B(d,n_0),(d,n) E=1.5-3 MeV; measured $\sigma(E,\theta)$. Natural target.
1967Di01: ^{11}B(d,n) E=1.1-2.9 MeV; measured $\sigma(E;E_n)$. Enriched targets.
1971Ri19: ^{11}B(pol. d,n) E=900 keV; measured analyzing power(θ). ^{13}C deduced resonance, J, π. See also (1971RiZL).
1972Th14: ^{11}B(d,nγ) E=4-4.8 MeV, θ(n)=0°; measured $\sigma(E,E_n,E_\gamma,\theta(n\gamma))$; deduced stripping reduced width amplitudes. Natural, isotopic targets.
1981An16: ^{11}B(d,2n) E=7-16 MeV; measured σ(E), thick target yields. Activation technique. Statistical model, pre-equilibrium decay modes.
2001Ho23: ^{11}B(d,n) E=24-111 keV; measured σ, S-factor. Comparison with earlier data.
2006Pa27: ^{11}B(d,n) E=120-160 keV; measured E_n, yields, angular distributions; deduced astrophysical S-factors.
2013Co12: ^{11}B(d,n) E<5 MeV; measured reaction products, E_γ, I_γ; deduced thin and thick target yields, $\sigma(\theta)$. Comparison with available data.
See discussion on polarized neutron production in (1966Ma21, 1969Mi20, 1970Bu15, 1971Hi09, 1972Me06, 1974Th02, 1975Si22).

Theory:
1972Se09: ^{11}B(d,n) E=0.2-1.02 MeV; analyzed polarization effects, resonant matrix elements. Polarized beams.
1975Se07: ^{11}B(pol. d,n); analyzed data; deduced criteria for simplified polarization measurement analysis.
1977Se09: ^{11}B(pol. d,n); calculated A(θ).
2012Co01: ^{11}B(d,n) E<10 MeV; calculated astrophysical reaction rates. TALYS code, comparison with NACRE compilations.

^{13}C Levels

E(level)†	J^{π}	Γ	E_d(res) (keV)	Comments
19692	5/2$^-$		1200	E(level): From E_d=1200 keV (1967Di01: n_1); see also E_d≈1 MeV (1972Se09). J^{π}: From polarization data in (1971Ri19); see also (1971Ri19, 1972Se09, 1975Se07, 1977Se09).
19904	(3/2$^+$,5/2$^+$)	≈600 keV	1450	E(level): From E_d=1450 keV (1967Di01: n_0). J^{π}: From polarization data in (1971Ri19); see also (1977Se09). Γ: From Γ_{lab}=700 keV (1967Di01).
20030		200 keV	1600	E(level): From E_d=1600 keV (1965Al17: n_0); see also (1977Se09). Γ: From (1977Se09: proposed).
20521 *8*		116 keV *10*	2180 *10*	E(level): From E_d=2180 keV *10* (1958Ka31: $\gamma_{15.1\ MeV}$); see also E_d=2180 keV *20* (1964Ku09: $\gamma_{15.1\ MeV}$), and 2200 keV (1967Di01: n_1). See also E_x=20.2 MeV from E_d=1800 keV (1965Al17: n_1). Γ: Weighted value from (1958Ka31: Γ_{cm}=115 keV *10*) and (1964Ku09: Γ_{lab}=140 keV *20*).
21281 *13*		159 keV *15*	3080 *15*	E(level): From E_d=3080 keV *15* (1958Ka31: $\gamma_{15.1\ MeV}$); see also

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^{11}B(d,nγ):res (continued)

^{13}C Levels (continued)

E(level)[†]	Γ	E_d(res) (keV)	Comments
			3080 keV *20* (1964Ku09: $\gamma_{15.1\ MeV}$). Γ: Weighted value from (1958Ka31: Γ_{cm}=160 keV *15*) and (1964Ku09: Γ_{lab}=185 keV *20*).
21721?		3600	E(level): From E_d=3600 keV (1965Al17: n_0).
21814 *17*	144 keV *21*	3710 *20*	E(level): From E_d=3710 keV *20* (1964Ku09). Γ: From Γ_{lab}=170 keV *25* (1964Ku09).
22198		4165	E(level): From average of E_d=4100 keV (1965Al17: n_1,n_2) and 4230 keV (1965Al17: n_0); see also 4400 keV (1964Ku09: $\gamma_{15.1\ MeV}$). Γ: broad (1964Ku09).
23073?		5200	E(level): From E_d=(5200) keV (1965Al17: n_1).
26791		9600	E(level): From E_d=9600 keV (1965Al17: n_0,n_1,n_2,n_3).
27466		10400	E(level): From E_d=10400 keV (1965Al17: n_0,n_2,n_3).

[†] Deduced from E_d(res), using ^{13}C, ^{11}B and d masses from (2021Wa16: AME-2020). E_x=S(^{2}H)+$E_{c.m.}$(relativistic).