

$^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$

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

1969Vo01,1970Vo02: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=78 MeV; measured $\sigma(E(^{13}\text{N}), E(^{13}\text{C}), \theta)$, $\sigma(\theta)$ for $\theta=5^\circ-37^\circ$. DWBA analysis.
1974De03: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=100 MeV; measured $\sigma(E(^{13}\text{N}), \theta)$ for $\theta_{\text{c.m.}}=10^\circ$ to 35° . ^{13}C deduced levels, L.
1975Na15: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=155 MeV; measured $\sigma(\theta)$ for $\theta=20^\circ$ to 50° . ^{13}C levels deduced S-factors.
1975Vo05: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=155 MeV; measured $\sigma(\theta)$ for $\theta_{\text{c.m.}}=20^\circ$ to 50° .
1976Ba16: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=28,32,34,36 MeV; measured $\sigma(E(^{13}\text{N}), \theta)$ at $\theta_{\text{c.m.}} \approx 40^\circ$ to 90° ; deduced angular symmetry violation, existence of complex (2-step) reaction mechanism.
1981LiZV: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=53.5 MeV; measured $\sigma(\theta)$. DWBA analysis.
1983Qu02: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=48 MeV; measured $\sigma(E1, E2, \theta1, \theta2)$; deduced reactions σ , proton rapidity plot. Dalitz plot analysis, analyzed projectile fragmentation, light particle emission.
1997Zi05: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$; measured $\sigma(\theta)$ for $\theta_{\text{c.m.}}=10^\circ$ to 70° ; deduced reaction mechanism. Coupled reaction channels analysis.

Theory:

1969Do07: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$; calculated $\sigma(\theta)$ with recoil damping.
1973De02: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$; calculated $\sigma(\theta)$; analyzed recoil effects. DWBA.
1973De35: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{C})^{13}\text{N}$; calculated $\sigma(\theta)$, S-factors, recoil effects.
1974Br18: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=78 MeV; calculated recoil, finite range effects.
1974Br37: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})^{13}\text{C}_{\text{g.s.}}$ E=78,100,150 MeV; calculated $\sigma(E(^{13}\text{N}), \theta)$.
1975Re04: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=78 MeV; calculated σ .
1976Ku06: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=100 MeV; analyzed anomalous $\sigma(\theta)$.
1976Na09: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=155 MeV; calculated $\sigma(\theta)$.
1978Na15: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=100 MeV; calculated $\sigma(\theta)$. DWBA, CCBA, finite range.
1979Do13: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=78 MeV; calculated $\sigma(\theta)$. DWBA with recoil, strong absorption, eikonal-like representation of elastic scattering.
1983Os08: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=100 MeV; analyzed $\sigma(\theta)$; deduced model parameters. ^{13}C levels deduced S-factors.
1984Bl21: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=70 MeV; calculated $\sigma(\theta)$.
1988Ka27: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=68 MeV; analyzed $\sigma(\theta)$.
2002Ke11: $^{12}\text{C}(^{14}\text{N}, ^{13}\text{N})$ E=100 MeV; analyzed $\sigma(\theta)$. ^{13}C deduced neutron binding potential radius, possible core deformation.
Coupled channels approach.

 ^{13}C Levels

E(level) [†]	J ^π [†]	L [†]	C ₂ S ₂ [†]	Comments
0	1/2 ⁻	0,1	0.72	E(level), J ^π : See (1974De03,1975Na15). L: (1974De03,1975Na15). C ₂ S ₂ : deduced from C ₁ S ₁ C ₂ S ₂ =0.50 (1975Na15) and assuming C ₁ S ₁ given by (1967Co32). See also the product S-factor=0.51 (1974De03) and 0.53 (1973De35).
3090	1/2 ⁺	1		E(level), J ^π : See (1974De03,1975Na15). L: (1974De03).
3680	3/2 ⁻			E(level): See (1974De03,1975Na15,1997Zi05). J ^π : See (1974De03,1975Na15).
3850	5/2 ⁺	2,3		E(level): See (1974De03,1975Na15,1997Zi05). J ^π : See (1974De03,1975Na15). L: (1975Na15).
6870	5/2 ⁺		0.57	E(level), J ^π : See (1975Na15). C ₂ S ₂ : deduced from C ₁ S ₁ C ₂ S ₂ =0.39 (1975Na15) and assuming C ₁ S ₁ given by (1967Co32). See also the product S-factor=0.37 (1974De03).
7.3×10 ³ 3				E(level): Unresolved group including $^{13}\text{C}^*$ (6.86+7.50+7.55+7.68) from (1974De03). Level not placed in Adopted Levels.

[†] From DWBA analysis in, for example, (1974De03,1975Na15) as noted.