^{12}C(p,π^+)

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

Most relevant:

1973Da24: ^{12}C(p,π^+) E=185 MeV; measured σ(E(π^+),θ); deduced levels.

1980So05: ^{12}C(p,π^+) E=200 MeV; measured σ(E(π^+)); deduced reaction mechanism.

1984Lo13: ^{12}C(pol. p,π^+) E=200-250 MeV; measured $\sigma(\theta)$, analyzing power vs θ; deduced isobar excitation role. Microscopic two-nucleon models.

1985Bi04: ^{12}C(p,π^+) E=201,180 MeV; measured $\sigma(\theta$,E(π)); deduced σ(E).

1987Ko01: ^{12}C(pol. p,π^+) E=200 MeV; measured σ(E(π)), analyzing power vs θ; deduced quasifree two nucleon collisions role. Magnetic spectrometer.

Others:

1970Do04: ^{12}C(p,π^+) E=600 MeV; measured $\sigma(E_\pi)$.

1971Da10: ^{12}C(p,π^+) E=185 MeV; measured σ(E(π^+),θ).

1977BeZY: ^{12}C(p,π^+) E=148-160 MeV; measured σ.

1978Au07: ^{12}C(pol. p,π^+) E=200 MeV; measured $\sigma(\theta)$.

1979Ma38: ^{12}C(p,π^+) E=0.5-10 MeV above threshold; measured σ.

1979Ma39: ^{12}C(p,π^+) E=8-16 MeV above threshold; measured inclusive σ; deduced A-dependence.

1980Ho20: ^{12}C(p,π^+) E=300 MeV; measured $\sigma(\theta)$; deduced structure, reaction process interplay.

1980So05: ^{12}C(p,π^+) E=200 MeV; measured σ(E(π^+)); deduced reaction mechanism.

1981MaZT: ^{12}C(pol. p,π^+) E=200 MeV; measured $\sigma(\theta)$, analyzing power vs θ. ^{12}C(pol. p,π^+) E=330-425 MeV; measured σ(inclusive). Semiclassical model analysis.

1981Sj02: ^{12}C(pol. p,π^+) E=147-159 MeV; measured $\sigma(\theta)$, analyzing power vs θ.

1981So04: ^{12}C(p,π^+) E=156-200 MeV; measured $\sigma(\theta)$; deduced single-particle, two particle-one hole final state effects.

1982Lo03: ^{12}C(pol. p,π^+) E=200-250 MeV; measured $\sigma(\theta)$, analyzing power vs θ; deduced analyzing power energy, structure dependences.

1984GrZW: ^{12}C(pol. p,π^+) E=170,183,190 MeV; measured $\sigma(\theta)$, analyzing power vs θ; deduced P-, S-wave amplitude energy dependence, barrier penetration factor consistency effects.

1986Fa03: ^{12}C(pol. p,π^+) E=400,450 MeV; measured $\sigma(\theta$,E(π^+)), analyzing power vs θ, E(π^+). Quasi-free model.

1987Ho21: ^{12}C(p,π^+) E=166,186 MeV; measured $\sigma(\theta)$. Recoil detection method.

1987Hu08: ^{12}C(p,π^+) E=250,354,489 MeV; measured $\sigma(\theta$,E); deduced reaction mechanism.

1988Ab05: ^{12}C(p,π^+) E=1 GeV; measured $\sigma(\theta)$ vs pion momentum; deduced reaction mechanism.

1989Ko21: ^{12}C(pol. p,π^+) E=200 MeV; measured $\sigma(\theta)$ analyzing power vs θ deduced reaction mechanism. ^{13}C deduced levels, J, π. Shell model calculations.

1996Ja25: ^{12}C(p,π^+) E=166,294 MeV; measured $\sigma(\theta)$. High momentum transfer, recoil detection at a cooler ring.

Theory:

1971Re12: ^{12}C(p,π^+) E=600 MeV; calculated σ.

1972Am05: ^{12}C(p,π^+) E=600 MeV; analyzed σ. Single-particle model.

1973Di08: ^{12}C(p,π^+) E=185 MeV; calculated $\sigma(E_{\pi^+},\theta)$.

1973Ei01,1973Ei05: ^{12}C(p,π^+) E=600 MeV; calculated σ.

1973Ke02: ^{12}C(p,π^+) E=185 MeV; calculated σ.

1973Ro10: ^{12}C(p,π^+) E=68,185 MeV; calculated $\sigma(\theta)$. DWBA.

1974Ho13: ^{12}C(p,π^+) E=185 MeV; calculated σ(E(π^+),θ).

1974Mi06,1974Mi11: ^{12}C(p,π^+) E=185 MeV; calculated $\sigma(\theta$,E(π^+)).

1975No05: ^{12}C(pol. p,π^+), calculated polarization.

1976Le02: ^{12}C(p,π^+) E=185 MeV; calculated σ. DWBA calculations.

1976Mi14: ^{12}C(p,π^+); calculated $\sigma(\theta)$.

1977Gi06: ^{12}C(p,π^+) E=185 MeV; calculated $\sigma(\theta)$.

1977Ku21: ^{12}C(p,π^+) E=185 MeV; calculated σ.

1978Mi02: ^{12}C(p,π^+) E=185 MeV; calculated $\sigma(\theta)$.

1978Yo02: ^{12}C(pol. p,π^+) E=200 MeV; calculated asymmetry.

$^{12}C(p,\pi^+)$ (continued)

1981Bu18: $^{12}C(p,\pi^+)$ E=730 MeV; calculated $\sigma(\theta)$, inclusive spectra. Isobar model, intranuclear cascade.
1982Co07: ^{12}C(pol. p,π^+) E=159,200 MeV; caculated $\sigma(\theta)$, A(θ). DWBA, Dirac equation, different pion-nucleon vertices.
1984Gu27: $^{12}C(p,\pi^+)$ E=threshold−325 MeV; calculated pion production σ(E). Knockout model.
1984Ke02: ^{12}C(pol. p,π^+) E=200 MeV; calculated $\sigma(\theta)$, analyzing power vs θ. Isobar-doorway model.
1985Iq01: $^{12}C(p,\pi^+)$ E=250,265,200 MeV; calculated $\sigma(\theta)$. Two-nucleon model, intermediate isobar effects.
1987Ku06, 1987KuZW: $^{12}C(p,\pi^+)$ E≈200 MeV; calculated $\sigma(\theta)$ vs momentum transfer; deduced structure effects. Shell model.
1994Fa10: ^{12}C(pol. p,π^+) E=200 MeV; analyzed $\sigma(\theta)$, analyzing power data.

^{13}C Levels

E(level)	J^π‡	Comments
0†	$1/2^-$	
3089†	$1/2^+$	
3685†	$3/2^-$	E(level): Unresolved from nearby states.
3854†	$5/2^+$	E(level): Unresolved from nearby states.
6860†	$5/2^+$	
7490†	$(7/2^+)$	E(level): Unresolved from nearby states.
7550†	$5/2^-$	E(level): Unresolved from nearby states.
7686?†	$3/2^+$	E(level): Unresolved from nearby states.
8400†	$3/2^+$	
9.50×10^3†	$9/2^+$	
11.9×10^3		E(level): Reported in (1987Ko01,1987Hu08,1989Ko21).
14×10^3		E(level): Reported in (1985Bi04,1987Ko01,1987Hu08,1989Ko21).
21470		E(level): Reported in (1985Bi04,1987Ko01,1987Hu08,1989Ko21). J^π,T: (1987Ko01,1989Ko21) suggested $J^\pi=(7/2^+,9/2^+)$ with a preference for $7/2^+$; they discussed a potential 1/2, 3/2 isospin mixing for this level. On the other hand, (1994Fa10) suggests this is a $13/2^-$ level with a $(1d_{5/2})^2(1p_{3/2})^{-1}$ configuration.

† Values listed in (1980So05). See also (1971Da10, 1980So05, 1981Sj02, 1987Ko01, 1989Ko21) for discussion on unresolved states.
‡ From, for example, A_y measurements in (1989Ko21). See (1970Do04, 1971Da10, 1973Da24, 1978Au07, 1980Ho20, 1980So05, 1981Sj02, 1981So04, 1982Lo03, 1984Lo13, 1987Hu08, 1987Ko01, 1989Ko21, 1996Ja25) for angular distributions, differential cross sections, A_y measurements and for discussion on single and multi-step reaction processes.