$^{12}C(^{24}Mg,2^{12}C),(^{20}Ne,2^{12}C)$ 2001Sh08,2001Fr03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

Others: 1999Co15, 1998Ch48, 1995Le22, 1995Cu01 (Brief refort – appears to be superseded by 2001Sh08, 2001Fr03), 1995Ch07, 1995Mi02, 1991Fu09.

2001Sh08: $^{12}C(^{24}Mg, 2^{12}C)$, E=170 MeV; natural carbon targets. Two Gas-Si-CsI hybrid detector telescopes centered horizontally on either side of the optical beam axis at laboratory angle of 16°, 50 mm deep longitudinal ionization chambers, CsI(Tl) scintillation detectors. Measured breakup fragments energy spectra, angular correlations. Deduced levels, spin and parity.

2001Fr03: $^{12}C(^{20}Ne, 2^{12}C)$, (^{20}Ne, $^{8}Be^{16}O$), E=110, 160 MeV; natural carbon targets. Two gas-silicon hybrid telescopes, gas ionization chambers provided ΔE signal. Measured breakup fragments energy spectra, angular correlations. Deduced levels, spin and parity. FWHM ~1.3 MeV.

1998Ch48: $^{12}C(^{12}C,^{12}C')$, E(cm)=31-45 MeV; measured excitation function, particle angular correlations following breakup. Deduced high-spin resonances.

1995Mi02: $^{12}C(^{12}C,\alpha)$, ($^{12}C,^{8}Be$), E=50-70 MeV; natural ^{12}C target. Two surface barrier detector telescopes. Measured α, ^{8}Be spectra, $\sigma(\theta)$ vs E. Deduced resonance, decay features, α-chain character.

^{24}Mg Levels

E(level)†	Jπ†‡	Comments
20.5×10^3& *2*	(2^+)	
21.1×10^3 *2*	4^+	
21.9×10^3 *2*	4^+	
22.3×10^3 *2*	4^+	
22.4×10^3@ *2*	(8)@	
22.9×10^3& *2*	6^+	E(level),Jπ: In 2001Fr03: 23.0×10^3 *200* and spin=6,8 (^{20}Ne, $^{8}Be^{16}O$).
23.8×10^3 *2*	$6^+,(8^+)$	E(level),Jπ: In 2001Fr03: 23.4×10^3 *200* and spin=8 ($^{20}Ne,2^{12}C$) and 23.8×10^3 *200* and spin=8 ($^{20}Ne,^{8}Be^{16}O$).
24.3×10^3@ *2*	9@	
24.6×10^3 *2*	8^+	E(level),Jπ: In 2001Fr03: 24.5×10^3 *200* and spin=8,6 ($^{20}Ne,2^{12}C$).
24.8×10^3@ *2*	9@	
25.1×10^3 *2*	(6^+)	E(level),Jπ: In 2001Fr03: 25.1×10^3 *200* and spin=8 ($^{20}Ne,2^{12}C$).
(25.3×10^3@)		E(level): Uncertain level not adopted.
25.8×10^3@ *2*	(9,10)@	
26.2×10^3# *2*	10#	
26.4×10^3 *2*	8^+	
26.8×10^3# *2*	10#	
27.4×10^3@ *2*		
27.8×10^3# *2*	10#	E(level),Jπ: In 2001Fr03: 27.9×10^3 *200* and spin=10 ($^{20}Ne,^{8}Be^{16}O$).
29.1×10^3# *2*	10,12#	E(level): In 2001Fr03: 29.0×10^3 *200* ($^{20}Ne,^{8}Be^{16}O$).
30.3×10^3# *2*	12#	E(level): In 2001Fr03: 29.9×10^3 *200* ($^{20}Ne,^{8}Be^{16}O$).
31.2×10^3# *2*	12#	
32.7×10^3# *2*	10#	E(level): Other: 32.5×10^3 (1998Ch48) – dominant total angular momentum J=18.
37.5×10^3		E(level): From 1998Ch48 – dominant total angular momentum J=20.
43.0×10^3		E(level): From 1998Ch48 – dominant total angular momentum J=22.
46.4×10^3	$(14^+,16^+)$	E(level),Jπ: From 1995Mi02.

† From 2001Sh08. Others are from 2001Fr03, flagged by footnote. 2001Sh08 note an uncertainty of ~150 keV in the absolute excitation energy was expected for breakup experiments of this kind. 2001Fr03 reports a systematic uncertainty in the reconstructed excitation energies of ~200 keV. Evaluators assign 200 keV in both cases.

Continued on next page (footnotes at end of table)

$^{12}C(^{24}Mg,2^{12}C),(^{20}Ne,2^{12}C)$ 2001Sh08,2001Fr03 (continued)

^{24}Mg Levels (continued)

‡ Spin parity assignments are based on measured and projected angular correlation measurement data of the decaying state in 2001Sh08 or 2001Fr03. The periodicity of the ridges is described by a Legendre polynomial of order of the spin of the decaying state. Parity $(-1)^J$ for the decaying state of natural parity, if the recoiling particle has spin-zero.

From 2001Fr03 ($^{20}Ne,2^{12}C$).

@ From 2001Fr03 ($^{20}Ne,^{8}Be^{16}O$).

& Overlaps with three or more Adopted Levels, not referenced in the adopted dataset.