

$^{12}\text{C}(^{13}\text{C},\alpha)$ 2010Fr04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	R. B. Firestone	NDS 127, 1 (2015)	15-Jan-2015

E=20 MeV beam from IPN Orsay Tandem accelerator. Target=20 $\mu\text{g}/\text{cm}^2$. The particles were detected with four double-sided Si strip detectors placed at different angles. FWHM \approx 350 keV. Measured (α)(particle) coincidences where either the ^{21}Ne nucleus or the ^{20}Ne produced via neutron decay of the unbound state of ^{21}Ne is detected, thus allowing states decaying by γ -rays and by neutrons to be separately observed. R-matrix analysis.

This experiment determined the neutron and γ decay channels, the high-spin states ($J\geq 7/2$) are expected to be connected with the γ decay channel only. The neutron decaying states are expected to be low spin.

S(n)(^{21}Ne)=6761.16 4 (2011AuZZ). First 2^+ in ^{20}Ne is at 1633.7 keV.

 ^{21}Ne Levels

E(level)	J^π	Relative strength	Comments
0		1	
0.35×10^3 8		1.3	
1.72×10^3 8		2.1	
2.80×10^3 8		4.8	
3.76×10^3 8		6.2	
4.51×10^3 8		4.3	
5.37×10^3 8		4.6	
5.76×10^3 8		2.3	
6.14×10^3 8		3.9	
6.54×10^3 8		2.3	
7.08×10^3 8		2.6	
7.32×10^3 8	$1/2^+$	2.2	Decays by neutrons to g.s. of ^{20}Ne . E(level), J^π : This state associated with neutron decay, and identified with previously known 7211, $1/2^+$ state, and not to 7357, ($7/2$, $9/2^+$) level.
7.40×10^3 8			
7.65×10^3 † 8		0.2	
7.92×10^3 † 8		1.7	
8.20×10^3 † 8		2.8	
8.44×10^3 8		0.3	
8.77×10^3 8		2.4	
8.90×10^3 ‡ 8	$(5/2^+, 7/2^-)$	0.8	
9.27×10^3 ‡ 8	$(5/2^+, 7/2^-)$	4.7	
9.82×10^3 8		4.0	Probably not a neutron decaying state since seen in all three decay spectra shown in 2010Fr04.
10.16×10^3 ‡ 8	$(5/2^+, 7/2^-)$	0.6	
10.35×10^3 8		1.8	Possible an α decaying state, since no other decay pattern matches.
11.22×10^3 8		1.0	
11.69×10^3 8		0.2	

† Neutron decay to ^{20}Ne , 0^+ ; the observed groups at 7.65, 7.92 and 8.20 MeV associated with 7627, $3/2^-$; 7979, $3/2^-$; 8008, $1/2^-$; 8065, $3/2^+$, and 8303, $3/2^-$ levels known earlier; whereas previously known states at 7982, ($7/2, 11/2$) $^+$; 8155, ($9/2$) $^+$, and 8241, ($11/2$) $^+$ are linked with γ decay channel.

‡ Neutron decay to 2^+ state in ^{20}Ne , less pronounced in ^{20}Ne , 0^+ decay.