^{4}He(^{12}Be,^{13}Bγ)   2008Ot05

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

2008Ot05: XUNDL file prepared by ANL (2008). A beam of 50 MeV/nucleon ^{12}B ions produced by fragmentation of a 100 MeV/nucleon ^{18}O beam at the RIKEN/RIPS facility bombarded a liquid He target located at the final focus of the RIPS. The beam was identified via ΔE vs. time-of-flight techniques before reaching the $\approx$143 mg/cm^{2}target that was surrounded by an array of six 6-cm by 2-cm HPGe γ-ray detectors from the GRAPE array positioned at θ=140$°$. The ^{13}B products were detected downstream of the target using a 1 meter^2 position-sensitive ΔE-E plastic scintillator.

The angular distributions of ^{13}B states are determined by gating on relevant de-excitation γ rays in the HPGE detectors. However, only three strong groups are naively visible in the γ spectrum to states at E$_x$=3681+3713, 4130, 4830 keV and no cascade transitions are observed. A more sophisticated deconvolution of the spectrum using GEANT4 premitted the authors to determine the relative populations of ^{13}B*(3483, 3535, 3681, 3713, 4130, 4830). In the present work, only the ^{13}B*(4830) angular distribution is analyzed using a DWBA, which found L=0. The authors suggest the state is a deformed J^π=1/2$^+$ intruder state.

Also See (2004OtZY, 2004OtZZ, 2004Sh24, 2008OtZZ).

^{13}B Levels

E(level)	J$^\pi$	L	Relative population[†]	Comments
0	3/2$^-$			J$^\pi$: From Adopted Levels, Gammas.
3483			19 5	
3535			20 5	
3681			74 7	
3713			68 7	
4131			49 4	
4829	1/2$^+$	0	100	L: From DWBA analysis of dσ/dΩ.
				J$^\pi$: From L(p)=0.
				C^{2}S=0.20 2. Systematic uncertaintity=60%.
				Configuration=π 1/2[220]$^1\otimes$(^{12}B deformed core); interpreted by 2008Ot05 as an intruder (deformed) state from the sd-shell.
				No cascading transitions to other states in ^{13}B were seen.

[†] Relative population is normalized to 100 for 4829 keV state, the quoted uncertainties are statistical only.

γ(^{13}B)

E$_\gamma$[†]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
3483[#]	3483		0	3/2$^-$
3535[#]	3535		0	3/2$^-$
3681[‡]	3681		0	3/2$^-$
3713[‡]	3713		0	3/2$^-$
4131	4131		0	3/2$^-$
4829	4829	1/2$^+$	0	3/2$^-$

[†] From commonly accepted γ-ray energy values listed in (2008Ot05).
[‡] 3681 and 3713 γ rays form an unresolved doublet.
[#] 3483 and 3535 γ rays form an unresolved doublet.

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Level Scheme

$^{13}_{5}$B$_8$