

$^9\text{Be}(^{45}\text{Cl}, ^{44}\text{S}\gamma)$ 2012Ri08,2012Ca09

| Type | Author | Citation | Literature Cutoff Date |
|-----------------|---------------------------|------------------|------------------------|
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2012Ri08: ^{45}Cl beam at 99.6 MeV/nucleon produced in fragmentation of E=140 MeV/nucleon ^{48}Ca beam with ^9Be target at NSCL. Cocktail beam contained 16% ^{45}Cl . Reaction products were separated by A1900 fragment separator and delivered to S800 magnetic spectrograph. Ion identification by time-of-flight and energy loss information in scintillation detectors and ionization chambers. Measured E_γ , I_γ , $(^{44}\text{S})\gamma$ coin, inclusive parallel momentum distribution, σ . Gamma rays were detected by SeGA array of 32-fold segmented HPGe detectors. Comparison with shell-model calculations and reaction theory predictions.

2012Ca09: ^{45}Cl beam at 42 MeV/nucleon produced in fragmentation of E=60 MeV/nucleon ^{48}Ca beam with carbon target at GANIL. Reaction products were separated by α spectrometer by $B\rho$ - ΔE - $B\rho$ method. Ion identification by time-of-flight and energy loss information in a Si detector at the entrance of SPEG spectrometer. Measured prompt γ in coincidence with ^{44}S nuclei using array of 70 BaF₂ detectors for γ rays. Measured E_γ , I_γ , $\gamma\gamma$, (particle) γ coin. Comparison with shell-model calculations. Evidence for prolate-spherical shape coexistence.

^{44}S Levels

| E(level) [†] | J^π [‡] | $T_{1/2}$ | σ (mb) [#] | Comments |
|-----------------------|----------------------|-----------|----------------------------|---|
| 0 | 0 ⁺ | | <1.3 | Total cross section=12.7 mb 7 (2012Ri08), 13 mb 3 (2012Ca09). |
| 1320 8 | 2 ⁺ | | 2.4 5 | |
| 2150 13 | (2 ⁺) | | 2.2 2 | |
| 2272 10 | (2 ⁺) | | 3.5 3 | |
| 2464 12 | (4 ⁺) | 69 ps 14 | 3.6 3 | $T_{1/2}$: from lineshape of 1144 γ (2012Ri08). |
| 3302 12 | (2 ⁺) | | 0.9 2 | |
| 4500 28 | | | | |

[†] From a least-squares fit to γ -ray energies.

[‡] From the Adopted Levels.

[#] Partial measured cross section for one-proton knockout (2012Ri08).

$\gamma(^{44}\text{S})$

| E_γ [†] | I_γ [†] | E_i (level) | J_i^π | E_f | J_f^π | Comments |
|-------------------------|-------------------------|---------------|-------------------|-------|-------------------|--|
| 952 7 | 43 3 | 2272 | (2 ⁺) | 1320 | 2 ⁺ | E_γ : weighted average of 977 23 (2012Ca09) and 950 6 (2012Ri08). I_γ : weighted average of 48 6 (2012Ca09) and 42 3 (2012Ri08). |
| 1030 6 | 10 2 | 3302 | (2 ⁺) | 2272 | (2 ⁺) | E_γ : weighted average of 1006 25 (2012Ca09) and 1031 6 (2012Ri08). I_γ : weighted average of 12 3 (2012Ca09) and 9 2 (2012Ri08). |
| 1144 9 | 34 3 | 2464 | (4 ⁺) | 1320 | 2 ⁺ | |
| 1198 ^{‡#} 25 | 18 [‡] 3 | 4500 | | 3302 | (2 ⁺) | |
| 1320 8 | 100 3 | 1320 | 2 ⁺ | 0 | 0 ⁺ | E_γ, I_γ : other: $E_\gamma=1321$ 10 with $I_\gamma=100$ 8 (2012Ca09). |
| ^x 1880 11 | 11 2 | | | | | |
| ^x 1945 12 | 13 2 | | | | | E_γ : could correspond to 1979 γ from 3302 level in 2012Ca09. |
| 1979 [‡] 19 | 24 [‡] 5 | 3302 | (2 ⁺) | 1320 | 2 ⁺ | |
| 2150 [#] 13 | 21 2 | 2150 | (2 ⁺) | 0 | 0 ⁺ | E_γ, I_γ : other: $E_\gamma=2156$ 49 with $I_\gamma=17$ 6 (2012Ca09). A 2262 38 gamma with relative $I_\gamma=21$ 5 reported earlier in 2012Ca09 was not seen by 2012Ri08. Upper limit of intensity is placed on a 2250 γ , which does not correspond to 2262 γ (2012Ri08). |
| ^x 2250 15 | <4 | | | | | |

[†] From 2012Ri08, unless otherwise noted.

[‡] From 2012Ca09, seen in coincidence with 1320 γ ; not seen in 2012Ri08.

[#] Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

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Legend

Level Scheme
Intensities: Relative I_γ

- ▶ $I_\gamma < 2\% \times I_\gamma^{\max}$
- ▶ $I_\gamma < 10\% \times I_\gamma^{\max}$
- ▶ $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - - -▶ γ Decay (Uncertain)

