¹²C(³⁴Na,³³Naγ) 2010Do05

History								
Туре	Author Citation		Literature Cutoff Date					
Full Evaluation	Jun Chen and Balraj Singh	NDS 199,1 (2025)	30-Sep-2024					

Includes ${}^{12}C({}^{33}Na, {}^{33}Na'\gamma)$.

2010Do05: Isotopes of interest produced by projectile fragmentation of ${}^{48}Ca^{18+}$ primary beam at E=345 MeV/u on a 20 mm thick rotating Be target at the Radioactive Ion beam Factory (RIBF) at RIKEN. Fragmentation products selected and separated using the B ρ - Δ E-B ρ method and incident on a 2.54 g/cm² carbon target at E=230-250 MeV/u. A NaI(Tl) based array (DALI2) with an efficiency of 15% at E γ =1332.5 keV was used for detecting the γ -rays and a spectrometer (ZeroDegree) for detecting and identifying the reaction products. Measured E γ , p γ -coincidence. Deduced level energy for an excited state in ³³Na for the first time. Also includes ${}^{12}C({}^{33}Na, {}^{33}Na'\gamma)$.

³³Na Levels

Shell-model calculations predict $3/2^+$ for g.s., $5/2^+$ for an almost degenerate state at 59 keV, and the next $3/2^+$ and $7/2^+$ states are around 1 MeV (2010Do05). Experimental energy of 467 keV is not in agreement with excited-state energies and spins from shell-model calculations.

E(level)	$J^{\pi \dagger}$	Comments			
0 467 <i>13</i>	$(3/2^+, 5/2^+) (3/2^+, 5/2^+)$	J^{π} : (3/2 ⁺) in Adopted Levels. E(level): from E γ value. J^{π} : (5/2 ⁺) in Adopted Levels.			

[†] From systematics of odd-A Na nuclides (2010Do05).

 $\gamma(^{33}Na)$

Eγ	E_i (level)	\mathbf{J}_i^{π}	\mathbf{E}_{f}	J_f^{π}	Comments
467 13	467	(3/2+,5/2+)	0	(3/2+,5/2+)	E_{γ} : average of 476 <i>I2</i> in (³³ Na, ³³ Na' γ) and 447 <i>I3</i> in (³⁴ Na, ³³ Na γ) (2010Do05)

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Level Scheme



