

${}^9\text{Be}({}^{61}\text{V}, {}^{60}\text{Ti}\gamma)$ 2014Ga07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	27-May-2014

One-proton knockout reaction.

2014Ga07: $E({}^{61}\text{V})=90.0$ MeV/nucleon beam from Coupled Cyclotron Facility at NSCL-MSU. Secondary ${}^{61}\text{V}$ beam produced in ${}^9\text{Be}({}^{82}\text{Se}, X), E=140$ MeV/nucleon primary reaction followed by fragment separation by A1900 fragment separator. Secondary ${}^9\text{Be}$ target= 376 mg/cm² thick located at target position of S800 magnetic spectrograph. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$ -coin, and $({}^{60}\text{Ti})\gamma$ -coin using GREYINA array of 36-folded segmented HPGe detectors arranged in 58° and 90° geometry. Gamma-ray energies were deduced from Doppler-corrected spectra. Deduced levels, J, π . Comparison of level structure in ${}^{60}\text{Ti}$ with shell-model calculations.

 ${}^{60}\text{Ti}$ Levels

Total measured σ for population of g.s., first 2^+ and 4^+ states is 7.9 mb 7 (2014Ga07).

E(level)	J^π	Percent population [†]	Comments
0	0^+	29 12	Percent population includes contribution from unobserved levels which do not feed the first 2^+ and 4^+ states.
850 5	$(2^+)^\ddagger$	30 11	
1716 7	$(4^+)^\ddagger$	40 10	

[†] Level population in percent. If a single γ ray of 860 keV is considered, then based on GEANT4 simulation of GREYINA array, 111% 12 of the knockout intensity is depopulated through this one γ ray, with no population of any level higher than first 2^+ state, which is considered unlikely. From the asymmetric peak shape of the 860 γ peak in spectrum, and $\gamma\gamma$ -coincidences, this peak is split in 850 γ from first 2^+ state and 866 γ from first 4^+ state, with respective populations of 30% 11 and 40% 10; while 29% 12 of the intensity related with ground state and unobserved levels does not feed the first 2^+ and 4^+ states.

[‡] From systematics of even-even nuclei, and comparison with shell-model calculations.

 $\gamma({}^{60}\text{Ti})$

E_γ	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
850 5	70 15	850	(2^+)	0	0^+
866 5	40 11	1716	(4^+)	850	(2^+)

[†] Deduced by the evaluator from relative level populations given by 2014Ga07.

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Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- Coincidence

