^{9}Be(^{54}Ti,^{53}Scγ) 2010Mc01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	10-Feb-2014

Study of one-proton knockout reaction.

E(^{54}Ti)=72 MeV/nucleon was produced from fragmentation of ^{76}Ge beam at 130 MeV/nucleon with a ^{9}Be target using A1900 fragment separator at NSCL facility. The secondary target of ^{9}Be was located at the target position of S800 spectrograph, its focal-plane detection system provided energy-loss measurements, timing information and positions and angles of projectile-like residues. The γ-rays were detected in coincidence with ^{53}Sc residues using SeGa array of 17, 32-fold segmented Ge detectors. Measured Eγ, Iγ, (^{53}Sc)γ coincidence, cross sections and momentum profile of the incident ^{54}Ti and parallel momentum distribution of ^{53}Sc residues. Comparisons with full *fp* shell-model calculations using OXBASH code and GXPF1 effective interaction.

Non-observation of γ rays and associated excited states reported in 2009Bh02: Phys Rev C 79, 014313 (2009) using ^{48}Ca(^{238}U,Xγ) reaction is consistent with the experiment in 2010Mc01, where only the population of single-particle states is expected.

^{53}Sc Levels

Note that E(x)=4000 listed in table I of 2010Mc01 is not a level, it is an excitation region in the *sd* shell, assumed for calculational purpose.

E(level)[†]	Jπ[‡]	Comments
0	(7/2⁻)	$1f_{7/2}$ state. Summed (inclusive) measured σ=17.6 mb *6* for one-proton knockout reaction, out of which direct feeding of g.s. is estimated as σ ≤6.7 mb *18*. Remaining σ=10.9 mb *17* is attributed to the excited states in the *sd* shell.
2110 *3*	(3/2⁻)	Most strongly populated excited state, which serves as collector of ≈60% of total feeding from higher *sd* excited states. $2p_{3/2}$ state.
3221? *4*	(5/2⁻)	$1f_{5/2}$ state.
3383? *4*	(1/2⁻)	$2p_{1/2}$ state.

[†] From Eγ data. Levels at 3221 and 3383 are tentative.
[‡] As implied from configurations in table I of 2010Mc01.

γ(^{53}Sc)

Eγ[†]	Ei(level)	Jiπ	Ef	Jfπ	Comments
1111[‡] *2*	3221?	(5/2⁻)	2110	(3/2⁻)	
1273[‡] *2*	3383?	(1/2⁻)	2110	(3/2⁻)	
[x]1539 *4*					
2110 *3*	2110	(3/2⁻)	0	(7/2⁻)	
[x]2459 *5*					Additional information 1.

[†] All γ rays observed in coincidence with ^{53}Sc fragments and are Doppler corrected in energy.
[‡] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

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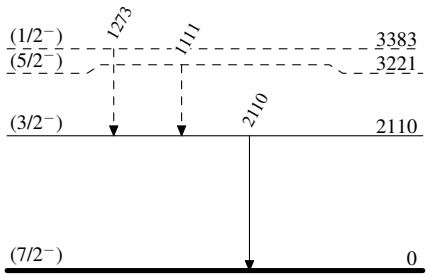
Legend

γ Decay (Uncertain)

Level Scheme



$^{53}_{21}Sc_{32}$