^{1}H(^{53}K,2pγ) 2019Li10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	21-May-2021

2019Li10: E(^{53}K)≈210 MeV/nucleon incident on a 151 mm thick liquid hydrogen target (H_2). Secondary ^{53}K beam was produced in ^{9}Be(^{70}Zn,X),E=345 MeV/nucleon reaction, followed by separation of ions of interest using Bρ-ΔE-TOF method in the BigRIPS fragment separator at the RIKEN-RIBF facility. Measured outgoing protons using time-projection chamber (TPC) of the MINOS device, and Doppler-corrected γ rays using the DALI2$^+$ γ-ray spectrometer with 226 NaI(Tl) detectors, surrounding the MINOS device. Measured Eγ, Iγ, and cross sections for population of excited states. Deduced first two excited states in ^{52}Ar, J, π. Comparison with theoretical calculations using several approaches: valence-space in-medium similarity renormalization group (VS-IMSRG) with chiral interactions, coupled-cluster (CC) using the DCE-EOM and 2PR-EOM methods, and large-scale shell model (LSSM) with SDPF-U and SDPF-MU interactions. Systematics of the first 2$^+$ states in even-even Ar isotopes.

^{52}Ar Levels

Measured inclusive σ=1.9 mb *1*.

E(level)[†]	J$^\pi$	Comments
0	0$^+$	Population σ=0.6 mb *3*, deduced from subtraction of summed partial cross sections to the two excited states from the inclusive σ=1.9 mb *1*, with the assumption that no other excited states are populated. Note that 2019Li10 give σ=0.7 mb *3*.
1656 *18*	(2$^+$)[‡]	Population σ=0.9 mb *2*.
2295 *39*	(2$^+$)[‡]	Population σ=0.4 mb *1*.

[†] From Eγ values.
[‡] From systematics of even-even nuclei, and comparison of measured level energies and cross sections with theoretical calculations.

γ(^{52}Ar)

E$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
1656 *18*	1656	(2$^+$)	0	0$^+$	Peak at 1656 keV observed at 5σ significance level.
2295 *39*	2295	(2$^+$)	0	0$^+$	Peak at 1656 keV observed at 3σ significance level.

[†] Quoted uncertainties include statistical and systematic.

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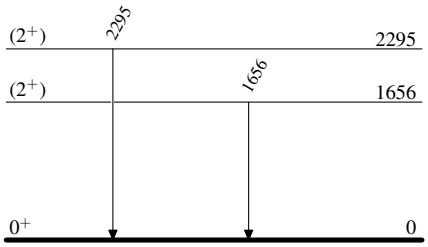
Level Scheme



$^{52}_{18}Ar_{34}$