

$^1\text{H}(^{56}\text{Ca},2\text{p}\gamma)$ 2022Ko06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Apr-2022

2022Ko06: excited state in ^{55}K reported for the first time using one-nucleon removal reaction. ^{56}Ca beam at 250 MeV/nucleon was produced in $^9\text{Be}(^{70}\text{Zn},\text{X}), E=345$ MeV/nucleon at RIBF-RIKEN facility, followed by separation and identification of fragments by TOF- ΔE - $B\pi$ method using BigRIPS spectrometer. Secondary reaction target was thick liquid hydrogen using MINOS system, surrounded by a time-projection chamber (TPC) to measure recoiling protons and protons removed from the projectiles. Reaction products were analyzed using SAMURAI magnetic spectrometer, with event-by-event identification by measuring the trajectory before and after the magnet with two sets of drift chambers, and the kinetic energy and time-of-flight using an array of plastic scintillator detectors. Gamma rays were detected using DALI² array of 226 NaI(Tl) detectors. Measured E_γ , I_γ , σ , and level lifetime from peak shape. Deduced level, J^π , spectroscopic factors. Comparison with theoretical calculations using large-scale shell model (LSSM), ab-initio valence-space in-medium similarity renormalization group (VS-IMSRG), and full-space self-consistent Green's function (SCGF NNLO_{sat} and SCGF NN+3N(lnl)).

 ^{55}K Levels

E(level)	J^π [†]	$T_{1/2}$	Comments
0	(3/2 ⁺)		Measured inclusive $\sigma=5.3$ mb 5 (2022Ko06). Measured exclusive $\sigma=3.5$ mb 7 (2022Ko06). Spectroscopic factor=3.09 62 (2022Ko06).
668 10	(1/2 ⁺)	<37 ps	Measured exclusive $\sigma=1.7$ mb 5 (2022Ko06). E(level): from E_γ . $T_{1/2}$: mean lifetime $\tau < 53$ ps, estimated from peak-shape analysis in $^1\text{H}(^{56}\text{Ca},2\text{p}\gamma)$ (2022Ko06). Spectroscopic factor=1.31 42 (2022Ko06).

[†] from theoretical calculations (2022Ko06) using different models: large-scale shell model (LSSM), ab-initio valence-space in-medium similarity renormalization group (VS-IMSRG), and full-space self-consistent Green's function (SCGF NNLO_{sat} and SCGF NN+3N(lnl)).

 $\gamma(^{55}\text{K})$

E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π
668 10	668	(1/2 ⁺)	0	(3/2 ⁺)

 ${}^1\text{H}({}^{56}\text{Ca}, 2\text{p}\gamma)$ 2022Ko06Level Scheme