^{1}H(^{54}Ca,pnγ)   **2019Ch43**

	History		
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	28-May-2021

2019Ch43: ≈200 MeV/nucleon ^{54}Ca beam produced in fragmentation of 345 MeV/nucleon ^{70}Zn beam at RIBF-RIKEN facility. Target was 151-mm thick liquid hydrogen of MINOS device. Fragments were separated using BigRIPS separator, and reaction residues were analyzed using the SAMURAI spectrometer. Outgoing protons were detected using a 300-mm long cylindrical time projection chamber (TPC), and outgoing neutrons using two large-acceptance plastic scintillator arrays, NeuLAND demonstrator and NEBULA, placed at zero degree. The γ rays were detected using DALI-2 array of 226 NaI(Tl) detectors. Measured Eγ, Iγ, pγ-coin, nγ-coin, and $\gamma\gamma$-coin. Deduced levels, J, π, exclusive and inclusive cross sections, L-transfers from parallel and transverse momentum distributions compared with distorted-wave impulse approximation (DWIA), and spectroscopic factors. Comparison with shell-model calculations using the effective GXPF1Bs interaction, and with ab initio calculations.
Quasifree one-neutron knockout reaction.

^{53}Ca Levels

E(level)	J$^{\pi\dagger}$	L	C^{2}S‡	Comments
0	(1/2$^-$)	(1)	2.2 *4*	Exclusive σ=15.9 mb *17*.
				Inclusive σ=36.0 mb *12*.
				C^{2}S=2.2 *2*(stat) *3*(theory).
				Configuration=νp$_{1/2}$.
1738 *17*	(5/2$^-$)	(3)	0.23 *8*	Exclusive σ=1.0 mb *3*.
				C^{2}S=0.23 *7*(stat) *3*(theory).
				Configuration=νf$_{5/2}$.
2220 *13*	(3/2$^-$)	(1)	3.1 *5*	Exclusive σ=19.1 mb *12*.
				C^{2}S=3.1 *2*(stat) *5*(theory).
				Configuration=νp$_{3/2}$.

† From L-transfers, deduced from experimental parallel momentum distributions and compared with distorted-wave impulse approximation (DWIA) calculations.

‡ Ratio of experimental and theoretical single-particle cross sections, the latter calculated in the distorted-wave impulse approximation (DWIA), averaged for the thick target. The two uncertainties, statistical and the one from theoretical σ(single-particle), listed in comments, were combined in quadrature by the evaluator.

γ(^{53}Ca)

The 1738γ and 2220γ were not observed in coincidence (2019Ch43).

E$_\gamma$	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
1738 *17*	1738	(5/2$^-$)	0	(1/2$^-$)
2220 *13*	2220	(3/2$^-$)	0	(1/2$^-$)

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Level Scheme

$^{53}_{20}$Ca$_{33}$