^{151}Sm(t,p) 2005Bu21

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Additional information 1.

E=15 MeV. Measured E(proton), $\sigma(\theta,E_p)$ with an Enge split-pole magnetic spectrograph using photographic plates as detectors. FWHM=15 keV. DWBA analysis.

J^π(^{151}Sm target)=5/2$^-$.

^{153}Sm Levels

Relative (t,p) strengths for levels populated by L=0 transitions, normalized to 100 for the strongest transition in ^{153}Sm, are given under comments (with questionable values marked by (?)). The values were obtained from the scaling factors necessary for the DWBA curves to best fit the data points, and thus make use of measured cross sections at all angles.

E(level)[†]	J^π	L[#]	dσ/dΩ μb/sr (30°)[&]	Comments
90.9	5/2$^-$ [@]		≤3	Relative L=0 strength≤3. E(level): rounded value from ‘Adopted Levels’ for ^{153}Sm.
182.9	5/2$^-$ [@]	0	58 *6*	E(level): rounded value from ‘Adopted Levels’ for ^{153}Sm, this energy used as reference for obtaining excitation energies above 182.9 keV. Relative L=0 strength=55. Configuration=3/2[532].
369 *1*	(5/2$^-$)	(0)	14 *5*	Relative L=0 strength=17 (?).
449[a] *1*	5/2$^-$	0	95 *7*	Relative L=0 strength=100. E(level): This level has the strongest L=0 transition, indicating dominant component of configuration is 5/2[523]. The 1/2[530] configuration proposed earlier (1998He06) is not supported by the present (t,p) data.
549[a] *2*	7/2$^-$	(2)	8 *2*	
1061[‡] *2*	5/2$^-$	0	17[‡] *2*	Relative L=0 strength=21.
1079[‡] *2*	5/2$^-$	0	25[‡] *3*	Relative L=0 strength=32.
1140 *2*	5/2$^-$	0	16 *3*	Relative L=0 strength=21.
1383 *3*	(5/2$^-$)	(0)	16 *3*	Relative L=0 strength=13 (?).
1400 *2*	(5/2$^-$)	(0)	24 *3*	Relative L=0 strength=21 (?).

† The ground state population in ^{153}Sm was not observed. Peaks resulting from ^{152}Sm and ^{151}Eu target impurities were an important aid in determining excitation energies accurately. Precisely-known two-neutron separation energies for ^{153}Sm and ^{154}Sm, combined with peak positions in the (t,p) spectra, were used to establish that the lowest level populated significantly in ^{153}Sm has an excitation energy of 181.5 *15*. Excitation energies for other levels in ^{153}Sm are quoted relative to the adopted value of 182.9 keV for this level. The uncertainties for present energies includes the statistical error and an estimated calibration uncertainty.

‡ 1061 and 1079 form a doublet structure in the (t,p) spectra. The doublet is expected to include some intensity for ^{156}Sm ground state transition, due to the ^{154}Sm target impurity. The expected intensity for it is only about 2 or 3 percent of the total observed in the doublet.

Obtained from comparison of $\sigma(\theta)$ data with DWBA calculations.

@ From ‘Adopted Levels’ in ^{153}Sm.

& The uncertainty is statistical only, ≈15% uncertainty in the absolute normalization is not included.

a Band(A): 5/2[523] band. The dominant configuration for 450 level is assigned (2005Bu21) as 5/2[523] based on its strong population in (t,p) through L=0 transition from 5/2$^-$ ^{151}Sm g.s. with proposed (1983Ma71,1978Gu11) configuration of 5/2[523]+3/2[532].

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$^{153}_{62}Sm_{91}$