^{9}Be(^{34}Si,^{33}Siγ) 2020Jo06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 199,1 (2025)	30-Sep-2024

2020Jo06: E=98.5 MeV/nucleon ^{34}Si beam was produced via fragmentation of 140 MeV/nucleon ^{48}Ca primary beam on a 846 mg/cm^2 ^{9}Be target and separated using the A1900 fragment separator at NSCL. Reaction target was 100 mg/cm^2 ^{9}Be. Reaction residues were identified event-by-event with the S800 spectrograph. γ rays were detected with the GRETINA array of 7 detector modules each consisting of 4 HPGe crystals with 36 segments each. Measured Eγ, Iγ, $\gamma\gamma$-coin, cross sections, momentum distributions. Deduced levels, J, π, L-transfers, spectroscopic factors. Comparisons with available data and theoretical calculations. Additional information 1.

2002En02: ^{9}Be(^{34}Si,^{33}Siγ) E=73 MeV/nucleon produced by fragmentation of ^{40}Ar beam at 100 MeV/nucleon by a ^{9}Be target and separated by A1200 Fragment-Recoil Separator. Measured Eγ, Iγ, $\gamma\gamma$, (particle)γ coin with an array of NaI(Tl) detectors.

All data are from 2020Jo06, unless otherwise noted.

^{33}Si Levels

Inclusive cross section σ(total)=116 mb *6*. Population fraction b_f in percentage (per 100 one-neutron removal reaction) and $\sigma_{exp}=\sigma(total)\times b_f$ from 2020Jo06 are given under comments.

E(level)[†]	J$^\pi$[‡]	L[‡]	C^{2}S[#]	Comments
0.0	3/2$^+$	2	3.90 *47*	b_f=50.8% *55*, σ_{exp}=58.9 mb *71*. σ=67 mb *10*, C^{2}S=4.5 *7* (2002En02).
1010.0 *10*	1/2$^+$	0	1.34 *8*	b_f=22.8% *7*, σ_{exp}=26.4 mb *16*. σ=41 mb *5*, C^{2}S=2.0 *3* (2002En02).
1435 *1*	7/2$^-$	(3)	0.72[@] *43*	E(level): From 2020Jo06. Additional information 2. b_f=9.0% *54*, σ_{exp}=10.4 mb *62*.
1981.0 *14*	3/2$^-$	1	0.35[@] *5*	b_f=4.5% *6*, σ_{exp}=5.2 mb *7*.
3159.1 *17*	(9/2$^-$)			b_f=0.0% *4*.
4090.1 *18*				b_f=1.0% *3*.
4268.3 *40*	(5/2$^+$)	(2)	0.15 *3*	b_f=1.7% *3*, σ_{exp}=2.0 mb *3*. σ=4.9 mb *7*, C^{2}S=1.3 *4* for a level at E=4290 *140*, L=2 (2002En02).
4347.3 *40*	(5/2$^+$)	(2)	0.66 *6*	b_f=7.6% *5*, σ_{exp}=8.8 mb *6*.
4932.1 *26*				b_f=1.8% *3*.
5443 *6*	(5/2$^+$)	(2)	0.10[&] *3*	b_f=1.1% *3*, σ_{exp}=1.2 mb *4*.

[†] From a least-squares fit to γ-ray energies, unless otherwise noted.
[‡] From 2020Jo06, based on measured momentum distributions compared with theoretical calculations, unless otherwise noted.
[#] Summed spectroscopic factors deduced from σ_{exp}/σ_{sp}, where σ_{exp} is the measured cross section as given under comments and σ_{sp} is the sum of cross sections from stripping and diffraction mechanisms and computed from the residue- and neutron-target elastic eikonal S matrices using the double- and single-folding optical limit of Glauber's multiple-scattering theory, respectively (2020Jo06).
[@] Upper limit assuming only one-neutron knockout (2020Jo06).
[&] Lower limit based on observed γ transition from state above S_n (2020Jo06).

γ(^{33}Si)

E$_\gamma$[†]	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
931 *1*		4090.1		3159.1	(9/2$^-$)
971 *1*	12.6 *41*	1981.0	3/2$^-$	1010.0	1/2$^+$
1010 *1*	100 *8*	1010.0	1/2$^+$	0.0	3/2$^+$
1724 *2*	10.6 *39*	3159.1	(9/2$^-$)	1435	7/2$^-$

Continued on next page (footnotes at end of table)

^{9}Be(^{34}Si,^{33}Siγ) 2020Jo06 (continued)

$\gamma(^{33}Si)$ (continued)

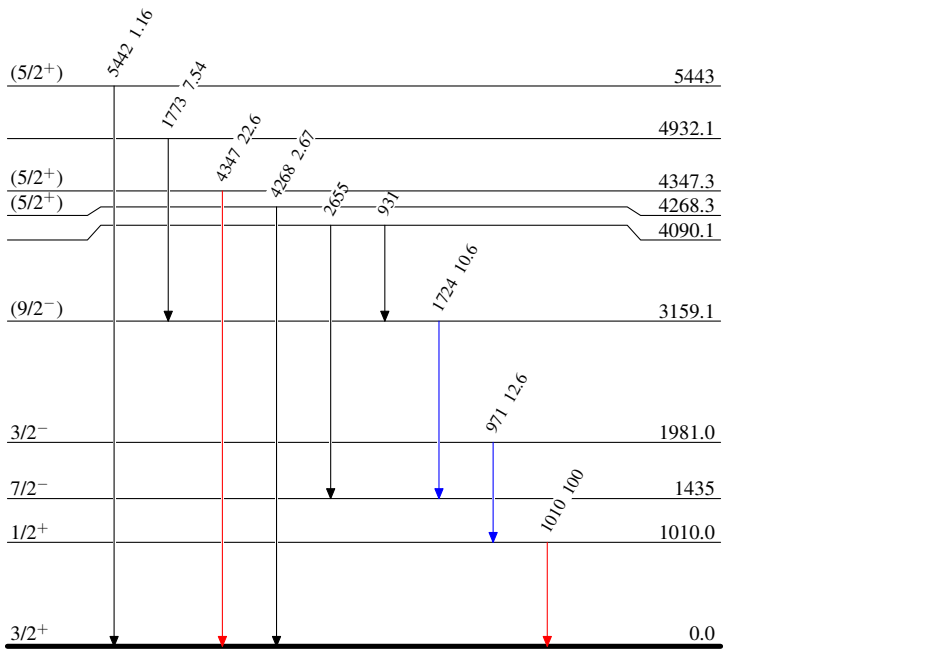
E_γ †	I_γ	E_i(level)	J_i^π	E_f	J_f^π
1773 *2*	7.54 *60*	4932.1		3159.1	$(9/2^-)$
2655 *3*		4090.1		1435	$7/2^-$
4268 *4*	2.67 *24*	4268.3	$(5/2^+)$	0.0	$3/2^+$
4347 *4*	22.6 *45*	4347.3	$(5/2^+)$	0.0	$3/2^+$
5442 *6*	1.16 *90*	5443	$(5/2^+)$	0.0	$3/2^+$

† From 2020Jo06.

^{9}Be(^{34}Si,^{33}Siγ) 2020Jo06

Level Scheme

Intensities: Relative I_γ



$^{33}_{14}Si_{19}$