^{24}Si εp decay   2009Ic05,2009Ic06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171, 1 (2021)	1-Jun-2020

Parent: ^{24}Si: E=0.0; J$^\pi$=0$^+$; T$_{1/2}$=141.4 ms *15*; Q(εp)=8930 *20*; %εp decay=45 *4*

^{24}Si-Q(εp): from 2017Wa10.

^{24}Si-T$_{1/2}$: Weighted average of 140.5 ms *15* (2009Ic05) and 143.4 ms *22* (2015Su15,2016Su22). Half-life 140.5 ms *15* in 2009Ic05 was recommended based on their measured values of 140.1 ms *26* (664γ(t)) 140.8 ms *18* (ΣIp(t)).

^{24}Si-%εp decay: 100−(%ε+%β^+) decay to bound states. %εp=55 *4* quoted in 2009Ic06 is incorrect, based on an email communication between the first author of 2009Ic06 and XUNDL compiler, dated May 25, 2009.

Others: 1998Ba53, 1998Cz01, 2001Ba07, 2015Su15, 2016Su22.

2009IC05,2009IC06: ^{24}Si produced by fragmentation of ^{28}Si beam, E=100 MeV, bombarding a ^{9}Be target. Reaction fragments were collected and analyzed using RIPS facility at RIKEN. The γ's were measured using a clover-type germanium detector and eight BGO counters. A plastic β veto counter was used to detect β particles. Protons were detected and separated from β's using the ΔE-E method. Four ΔE-E detectors were used, each consisting of a gas ΔE detector and silicon E detectors. Measured Eγ, Iγ, β, $\beta\gamma$ coin, E$_p$, I$_p$.

^{23}Mg Levels

E(level)[†]	J$^\pi$[†]
0.0	3/2$^+$
451	5/2$^+$
2359	1/2$^+$

[†] From Adopted Levels.

γ(^{23}Mg)

E$_\gamma$[†]	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$
1906 *1*	2359	1/2$^+$	451	5/2$^+$
2357 *2*	2359	1/2$^+$	0.0	3/2$^+$

[†] From 2009Ic05.

Delayed Protons (^{23}Mg)

E(p)[†]	E(^{23}Mg)	I(p)[‡#]	E(^{24}Al)	E(p)[†]	E(^{23}Mg)	I(p)[‡#]	E(^{24}Al)
1119 *21*	0.0	7.5 *7*	2991	3510 *10*	0.0	0.87 *10*	5382
1492 *13*	0.0	14 *1*	3364	3929 *50*	0.0	1.3 *4*	5801
1724 *13*	2359	4.8 *5*	5953	4081 *7*	0.0	7.9 *8*	5953
2024 *10*	2359	1.0 *1*	6243	4371 *11*	0.0	1.8 *2*	6243
2517 *9*	0.0	0.62 *8*	4389	4615 *11*	0.0	0.33 *5*	6487
2828 *7*	0.0	1.4 *2*	4700	4863 *11*	0.0	0.09 *2*	6735
3104 *8*	0.0	1.0 *1*	4976				

[†] From 2009Ic05, in center-of-mass (total decay energy).

[‡] From 2009Ic05, deduced in proportion to the relative intensities through renormalization with %εp=45 *4*.

[#] Absolute intensity per 100 decays.

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Decay Scheme

I(p) Intensities: I(p) per 100 parent decays

E(p)	I(p)	E($^{24}_{13}$Al)	E($^{23}_{12}$Mg)
1119	7.5	2991	0.0
1492	14	3364	0.0
2517	0.62	4389	0.0
2828	1.4	4700	0.0
3104	1.0	4976	0.0
3510	0.87	5382	0.0
3929	1.3	5801	0.0
4081	7.9	5953	0.0
4371	1.8	6243	0.0
4615	0.33	6487	0.0
4863	0.09	6735	0.0
1724	4.8	5953	2359
2024	1.0	6243	2359

0^+ 0.0   141.4 ms *15*

%εp=45   Q$_{\varepsilon p}$=8930 *20*

$^{24}_{14}$Si$_{10}$

6735
6487
6243
5953
5801
5382
4976
4700
4389

$1/2^+$ 2359

3364
2991

$^{24}_{13}$Al$_{11}$

$5/2^+$ 451

$3/2^+$ 0.0

$^{23}_{12}$Mg$_{11}$