

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	20-Aug-2015

$Q(\beta^-)=1050\times 10^1$  25;  $S(n)=472\times 10^1$  25;  $S(p)=13070$  SY;  $Q(\alpha)=-9810$  SY [2012Wa38](#)

Estimated uncertainties ([2012Wa38](#)): 320 for S(p) and Q( $\alpha$ ).

$S(2n)=11240$  250, 28610 390 (syst),  $Q(\beta^-n)=3140$  250 ([2012Wa38](#)).

[1983Re05](#), [1984Hi03](#):  $^{124}\text{Ag}$  produced and identified in  $^{235}\text{U}(n,F)$ , E=th, followed by on-line mass separation. Measured delayed  $\beta$ -neutron energies and intensities,  $\beta$  spectra,  $E\gamma$ ,  $I\gamma$ ,  $\gamma\gamma$ -coin, half-life of  $^{124}\text{Ag}$  isotope at BNL.

Additional information 1.

[1995Fe12](#), [1996Ka40](#):  $^{124}\text{Ag}$  produced in  $^{238}\text{U}(p,F)$ , E=1 GeV, followed by on-line mass separation, half-life at ISOLDE-CERN facility.

[2006Mo07](#), [2005Ka45](#), [2004KaZR](#):  $\text{Be}(^{136}\text{Xe},X)$ , E=121.8 MeV/nucleon, fragment separator at NSCL-MSU, measured  $T_{1/2}$  of ground state, measured half-life, delayed neutron emission probability.

[2014Ba18](#) (also [2012Ba62](#)):  $^{124}\text{Ag}$  produced in  $^{238}\text{U}(p,F)$  at beam energy of  $E(p)=50$  MeV at HRIBF-ORNL. Measured  $E\gamma$ ,  $I\gamma$ ,  $\gamma\gamma$ -coin, half-lives of two activities in  $^{124}\text{Ag}$ , one of low-spin ( $2^-$ ) and the other of high spin ( $8^-$ ).

[2015Lo04](#):  $^{124}\text{Ag}$  nuclide produced at RIBF-RIKEN facility in  $^9\text{Be}(^{238}\text{U},F)$  reaction at E=345 MeV/nucleon with an average intensity of  $6\times 10^{10}$  ions/s. Measured half-life by ion- $\beta$  correlation and maximum likelihood fits to the decay curve.

Mass measurement: [2010Br02](#).

 $^{124}\text{Ag}$  LevelsCross Reference (XREF) Flags

**A**  $^{124}\text{Ag}$  IT decay (1.46  $\mu\text{s}$ )

E(level)	$J^\pi$ <sup>†</sup>	$T_{1/2}$ <sup>‡</sup>	XREF	Comments
0+x	( $3^+$ )	191 ms 28	<b>A</b>	$\% \beta^- = 100$ ; $\% \beta^- n = 1.3$ 9 ( <a href="#">2006Mo07</a> ) Theoretical $T_{1/2} = 111$ ms, $\% \beta^- n = 1.26$ ( <a href="#">2003Mo09</a> ). On the basis of half-life of low-spin activity, $\% \beta^- n$ measured in <a href="#">2006Mo07</a> is assumed for this level rather than the 144-ms high-spin activity. $T_{1/2}$ : from $\gamma$ -decay curves ( <a href="#">2014Ba18</a> ). Others: 180 ms 3 ( <a href="#">2015Lo04</a> , ion- $\beta$ correlated curve), 187 ms +15-14 ( <a href="#">2006Mo07</a> ), 172 ms 5 ( <a href="#">1995Fe12</a> , delayed-neutron decay curve), 0.17 s 3 from $\gamma$ multiscaling ( <a href="#">1984Hi03</a> ) and 0.54 s 8 from delayed-neutron multiscaling ( <a href="#">1983Re05</a> ). It is possible that half-life values in <a href="#">2015Lo04</a> , <a href="#">2006Mo07</a> , <a href="#">1995Fe12</a> and <a href="#">1984Hi03</a> are for mixed activities proposed by <a href="#">2014Ba18</a> . $J^\pi$ : from <a href="#">2013La11</a> based on systematics. However, shell-model calculations by <a href="#">2013La11</a> suggest $1^-$ ground state and $3^+$ at 64 keV. <a href="#">2012Au07</a> suggest $3^+$ from systematics. Others: ( $2^-$ ) ( <a href="#">2014Ba18</a> ) from decay pattern to levels in $^{124}\text{Cd}$ and shell-model configuration, $\geq 2$ ( <a href="#">2005Ka45</a> ).
0+y	( $8^-$ )	144 ms 20		$\% \beta^- = 100$ ; $\% \beta^- n = ?$ Measured $\% \beta^- n = 1.3$ 9 ( <a href="#">2006Mo07</a> ) is assumed for the low-spin activity, however, it is possible that the high-spin isomer also decays by delayed-neutron emissions. $J^\pi, T_{1/2}$ : from <a href="#">2014Ba18</a> , half-life from $\gamma$ -decay curves. Other: $J \geq 7$ ( <a href="#">2005Ka45</a> ). $\% \text{IT} = 100$
155.6+x? 5	( $1^+$ )	0.14 $\mu\text{s}$ 5	<b>A</b>	E(level): reverse ordering of the 75.5-155.6 $\gamma$ cascade is also possible, which will give a level at 75.5 keV instead of 155.6 keV. $\% \text{IT} = 100$
231.1+x 7	( $1^-$ )	1.47 $\mu\text{s}$ 20	<b>A</b>	$\% \text{IT} = 100$ $T_{1/2}$ : weighted average of 1.46 $\mu\text{s}$ 20 ( <a href="#">2013La11</a> ), 1.62 $\mu\text{s}$ +29-24 ( <a href="#">2012Ka36</a> ), 1.3 $\mu\text{s}$ 3 ( <a href="#">2005WaZY</a> ).

Continued on next page (footnotes at end of table)

**Adopted Levels, Gammas (continued)** $^{124}\text{Ag}$  Levels (continued)

† For excited states, assignment are based on systematics and observed decay pattern (2013La11).

‡ From  $\gamma(t)$  (2013La11).

$\gamma(^{124}\text{Ag})$								
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult.	$\alpha^\ddagger$	Comments
155.6+x?	(1 <sup>+</sup> )	155.6 <sup>†</sup> 5	100	0+x	(3 <sup>+</sup> )	[E2]	0.303	B(E2)(W.u.)=0.9 4
231.1+x	(1 <sup>-</sup> )	75.5 <sup>†</sup> 5	100	155.6+x?	(1 <sup>+</sup> )	(E1)	0.363	B(E1)(W.u.)=3.2×10 <sup>-7</sup> 5 $\alpha(\text{exp})=0.8$ 10 if mult(155 $\gamma$ )=E2, 0.4 8 if mult(155 $\gamma$ )=E2 (2013La11).

† Reverse ordering of the 75.5-155.6  $\gamma$  cascade is also possible (2012Ka36).

‡ Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

**Adopted Levels, Gammas**Level Scheme

Intensities: Relative photon branching from each level

