

Adopted Levels

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	15-May-2011

$Q(\beta^-)=1.85\times 10^4$  syst;  $S(n)=3.\times 10^2$  syst;  $Q(\alpha)=-1.68\times 10^4$  syst [2012Wa38](#)

Note: Current evaluation has used the following Q record 18160 syst 10 syst 23290 calc -16540 syst [2011AuZZ,1997Mo25](#).

$Q(\beta^-)$ ,  $S(n)$ ,  $Q(\alpha)$  from [2011AuZZ](#),  $S(p)$  from [1997Mo25](#).  $S(n)=220$  ([1997Mo25](#),calculated).

Estimated uncertainties in [2011AuZZ](#): 1220 for  $Q(\beta^-)$ , 1410 for  $S(n)$ , 1380 for  $Q(\alpha)$ .

$Q(\beta^-n)=15040$  1220,  $S(2n)=3190$  1410 ([2011AuZZ](#)).  $S(2p)=44690$  (calculated,[1997Mo25](#)).

Values in [2003Au03](#) (from syst):  $Q(\beta^-)=16600$  1220,  $S(n)=470$  1350,  $Q(\alpha)=-19820$  1380,  $S(2n)=3740$  1220.

[2009Ta24](#), [2009Ta05](#):  $^{53}\text{Ar}$  identified by fragmentation of  $^{76}\text{Ge}$  beam at 132 MeV/nucleon at NSCL facility using A1900 fragment separator combined with S800 analysis beam line to form a two stage separator system. The transmitted fragments were analyzed event-by-event in momentum and particle identification. The nuclei of interest were stopped in eight Si diodes which provided measurement of energy loss, nuclear charge and total kinetic energy. The time-of-flight of each particle that reached the detector stack was measured in four different ways using plastic scintillators, Si detectors, and parallel-plate avalanche counters. The simultaneous measurement of  $\Delta E$  signals, the magnetic rigidity, total kinetic energy and the time-of-flight (tof) provided unambiguous identification of the atomic number, charge state and mass number.

 $^{53}\text{Ar}$  Levels

<u>E(level)</u>	<u><math>T_{1/2}</math></u>	<u>Comments</u>
0	>620 ns	<p><math>\% \beta^- = ?</math>; <math>\% \beta^- n = ?</math>; <math>\% \beta^- 2n = ?</math>  <math>\% \beta^- n = 26</math>, <math>\% \beta^- 2n = 34</math> (calculated,<a href="#">1997Mo25</a>).  Measured cross section=0.24 pb +28-16 using tungsten target (e-mail reply of Nov 11, 2009 from O. Tarasov, first author of <a href="#">2009Ta24</a>).  E(level): fragments observed by <a href="#">2009Ta24</a> are assumed to be in the ground state of <math>^{53}\text{Ar}</math>.  <math>J^\pi</math>: <math>5/2^-</math> (syst,<a href="#">2011AuZY</a>), <math>9/2^+</math> (prediction,<a href="#">1997Mo25</a>).  <math>T_{1/2}</math>: time-of-flight=620-650 ns (e-mail reply of Sept 23, 2009 from O. Tarasov). Actual half-life is expected to be much longer as suggested by systematics value of 3 ms (<a href="#">2011AuZY</a>) and calculated value of 15 ms (<a href="#">1997Mo25</a>).</p>