

Adopted Levels

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	31-May-2008

$S(p)=-1028$  15;  $Q(\alpha)=2.9\times 10^3$  syst 2012Wa38

Note: Current evaluation has used the following Q record 11990 calc  $-1028$  15 3210 syst 2003Au03,1997Mo25.

$\Delta Q(\alpha)=710$  (syst,2003Au03).

$Q(\epsilon p)=11730$  640 (syst,2003Au03).

S(n) from 1997Mo25, S(p) and Q( $\alpha$ ) from 2003Au03.

2004Da04 (also 2005Se21,2002Ma61):  $^{130}\text{Eu}$  produced in  $^{58}\text{Ni}(^{78}\text{Kr},p5n)$  reaction at  $E(^{78}\text{Kr})=425$  MeV, ATLAS accelerator facility. Recoil fragments were analyzed using Argonne Fragment Mass Analyzer (FMA) and implanted into a double-sided silicon strip (DSSD) detector. Other detectors used were a large silicon detector to veto positron and  $\beta$  delayed proton events and an array of four silicon detectors to veto events for particles emerging from the front surface of the DSSD detector. Measured proton spectra, isotopic half-life and production cross section. Structure calculations were used to deduce deformation and probable configuration.

1983La27: search for  $^{130}\text{Eu}$  proved negative in  $^{92}\text{Mo}(^{58}\text{Ni},X)$  reaction.

Additional information 1.

 $^{130}\text{Eu}$  Levels

E(level)	$J^\pi$	$T_{1/2}$	Comments
0	(1 <sup>+</sup> )	0.90 ms +49-29	<p>%p<math>\approx</math>100</p> <p>E(level): it is assumed that the observed activity corresponds to the g.s.</p> <p><math>T_{1/2}</math>: from timing of proton spectra (2004Da04). Earlier value from the same group: 0.90 ms +61-26 (2002Ma61).</p> <p>%p <math>\approx</math> 100 from half-life measured by 2004Da04 and calculated <math>\beta</math> decay half-life of 49 ms (1997Mo25).</p> <p>Measured proton energy=1020 15 (2004Da04).</p> <p>Measured production cross section <math>\approx</math> 9 nb (large uncertainty).</p> <p><math>J^\pi</math>: Proposed configuration=<math>\pi 3/2[411] \otimes \nu 1/2[411]</math>, <math>K^\pi=1^+, 2^+</math> with preference for <math>K^\pi=1^+</math> from Gallagher-Moszkowski rules. It should be noted that the measured half-life agrees better for <math>K=2</math> in model calculations. This configuration is based on following considerations: the assumption of spherical shape and WKB calculations predict half-life of 30 <math>\mu\text{s}</math> for <math>d_{5/2}</math> and 6 ms for <math>g_{7/2}</math> proton emission, both in disagreement with the measured half-life. In analogy with the deformed shape found for <math>^{131}\text{Eu}</math> through features of its proton decay, <math>^{130}\text{Eu}</math> is also assumed to have a deformation with <math>\beta_2 \approx 0.3</math>.</p> <p>Assuming the proton configuration of <math>3/2[411]</math> (as for <math>^{131}\text{Eu}</math>), calculations were done by 2004Da04 with the considerations of neutron in <math>1/2[411]</math> or <math>7/2[523]</math> orbital. Best agreement with the measured half-life was found for <math>K^\pi=2^+, 1^+</math>; other possible choices of <math>K^\pi=2^-</math> and <math>5^-</math> for <math>7/2[523]</math> neutron orbital were in disagreement.</p>