

<sup>78</sup>Sr ε decay (160 s) 1997Mu02,1992Gr09

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Ameenah R. Farhan, Balraj Singh		NDS 110, 1917 (2009)	30-Jun-2009

Parent: <sup>78</sup>Sr: E=0.0; J<sup>π</sup>=0<sup>+</sup>; T<sub>1/2</sub>=160 s 8; Q(ε)=3762 11; %ε+%β<sup>+</sup> decay=100.0

<sup>78</sup>Sr-Q(ε): from 2009AuZZ, 2003Au03.

1997Mu02: The <sup>78</sup>Sr isotope produced in <sup>54</sup>Fe(<sup>28</sup>Si,2p2n) reaction. Measured E<sub>γ</sub>, I<sub>γ</sub>, γγ, K x ray, isotopic half-life, two Ge detectors. The γγ coincidence spectra obtained with gates on 46.8γ and 103.5γ.

1992Gr09: Measured E<sub>γ</sub>, I<sub>γ</sub>, isotopic half-life.

1982Li17: Measured E<sub>γ</sub>, x rays, isotopic half-life. Four γ rays reported at 46.9, 87.0, 243.5 and 268.3.

The level scheme is proposed only by 1997Mu02 from their γγ data.

Total decay energy of 1231 keV 20 calculated (by RADLIST code) from level scheme is much lower than the expected value of 3762 keV 11. The decay scheme is not known well.

<sup>78</sup>Rb Levels

E(level) <sup>†</sup>	J <sup>π</sup>	T <sub>1/2</sub>	Comments
0.0	0 <sup>(+)</sup>		
46.9 2	(1 <sup>-</sup> )	0.91 μs 4	T <sub>1/2</sub> : γγ(t) (1997Mu02).
103.4 2	1 <sup>(+)</sup>		
134.2 2			
290.3 2	(1) <sup>‡</sup>		
315.1 2	(0 <sup>-</sup> ,1) <sup>‡</sup>		
504.7 2	(0 <sup>-</sup> ,1) <sup>‡</sup>		
896.4? 3			

<sup>†</sup> From least-squares fit to E<sub>γ</sub>'s, assuming Δ(E<sub>γ</sub>)=0.2 keV for each γ ray, reduced χ<sup>2</sup>=0.66.

<sup>‡</sup> Possible allowed or first forbidden ε+β<sup>+</sup> feeding from 0<sup>+</sup>.

γ(<sup>78</sup>Rb)

E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>†</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult.	α <sup>#</sup>	Comments
24.8 <sup>‡</sup>	≈5 <sup>‡</sup>	315.1	(0 <sup>-</sup> ,1)	290.3	(1)			I <sub>γ</sub> : most of the transition intensity is expected to be internally converted.
46.8	60 6	46.9	(1 <sup>-</sup> )	0.0	0 <sup>(+)</sup>	(E1)	0.882	α(K)=0.778 11; α(L)=0.0886 13; α(M)=0.01442 21; α(N+..)=0.001613 23
								α(N)=0.001556 22; α(O)=5.69×10 <sup>-5</sup> 8
								Mult.: E1 suggested by 1997Mu02 based on level lifetime and transition probability.
								I <sub>γ</sub> : quoted by 1992Gr09 from H. Grawe et al., 1981 Ann Rep hmi B373, 89 (1982).
								<a href="#">Additional information 1.</a>
								<a href="#">Additional information 3.</a>
87.5	27 1	134.2		46.9	(1 <sup>-</sup> )			α(K)=0.1161 17; α(L)=0.01313 19; α(M)=0.00217 3; α(N+..)=0.000255 4
103.5	100 5	103.4	1 <sup>(+)</sup>	0.0	0 <sup>(+)</sup>	(M1)	0.1317	α(N)=0.000245 4; α(O)=1.038×10 <sup>-5</sup> 15
								<a href="#">Additional information 2.</a>
156.2	11 1	290.3	(1)	134.2				<a href="#">Additional information 4.</a>
181.1	25 1	315.1	(0 <sup>-</sup> ,1)	134.2				<a href="#">Additional information 7.</a>
187.1	29 2	290.3	(1)	103.4	1 <sup>(+)</sup>			<a href="#">Additional information 5.</a>
189.8	16 1	504.7	(0 <sup>-</sup> ,1)	315.1	(0 <sup>-</sup> ,1)			<a href="#">Additional information 10.</a>
211.9	55 3	315.1	(0 <sup>-</sup> ,1)	103.4	1 <sup>(+)</sup>			I <sub>γ</sub> : much weaker In 1997Mu02;≈15, estimated (evaluators)

Continued on next page (footnotes at end of table)

$^{78}\text{Sr}$   $\varepsilon$  decay (160 s) **1997Mu02,1992Gr09** (continued) $\gamma(^{78}\text{Rb})$  (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
						from level-scheme figure 3 of <a href="#">1997Mu02</a> .
214.5	32 2	504.7	(0 <sup>-</sup> ,1)	290.3	(1)	<a href="#">Additional information 8.</a>
243.3	86 4	290.3	(1)	46.9	(1 <sup>-</sup> )	<a href="#">Additional information 11.</a>
268.1	60 3	315.1	(0 <sup>-</sup> ,1)	46.9	(1 <sup>-</sup> )	<a href="#">Additional information 6.</a>
370.5	10 1	504.7	(0 <sup>-</sup> ,1)	134.2		<a href="#">Additional information 9.</a>
401.2 <sup>‡</sup>	$\approx 16^{\ddagger}$	504.7	(0 <sup>-</sup> ,1)	103.4	1 <sup>(+)</sup>	<a href="#">Additional information 12.</a>
457.7	30 2	504.7	(0 <sup>-</sup> ,1)	46.9	(1 <sup>-</sup> )	<a href="#">Additional information 13.</a>
793.0 <sup>@</sup>	12 1	896.4?		103.4	1 <sup>(+)</sup>	<a href="#">Additional information 14.</a>

<sup>†</sup> From [1992Gr09](#) unless otherwise stated. The gamma-ray energies listed by [1997Mu02](#) are in agreement with those from [1992Gr09](#), but consistently lower by about 0.2-0.3 keV. Numerical values of intensities were not listed by [1997Mu02](#), these were shown only in terms of width of arrows in the decay scheme drawing.

<sup>‡</sup> From [1997Mu02](#) only. Intensity estimated by the evaluators from width of arrows in figure 3 of [1997Mu02](#).

<sup>#</sup> Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

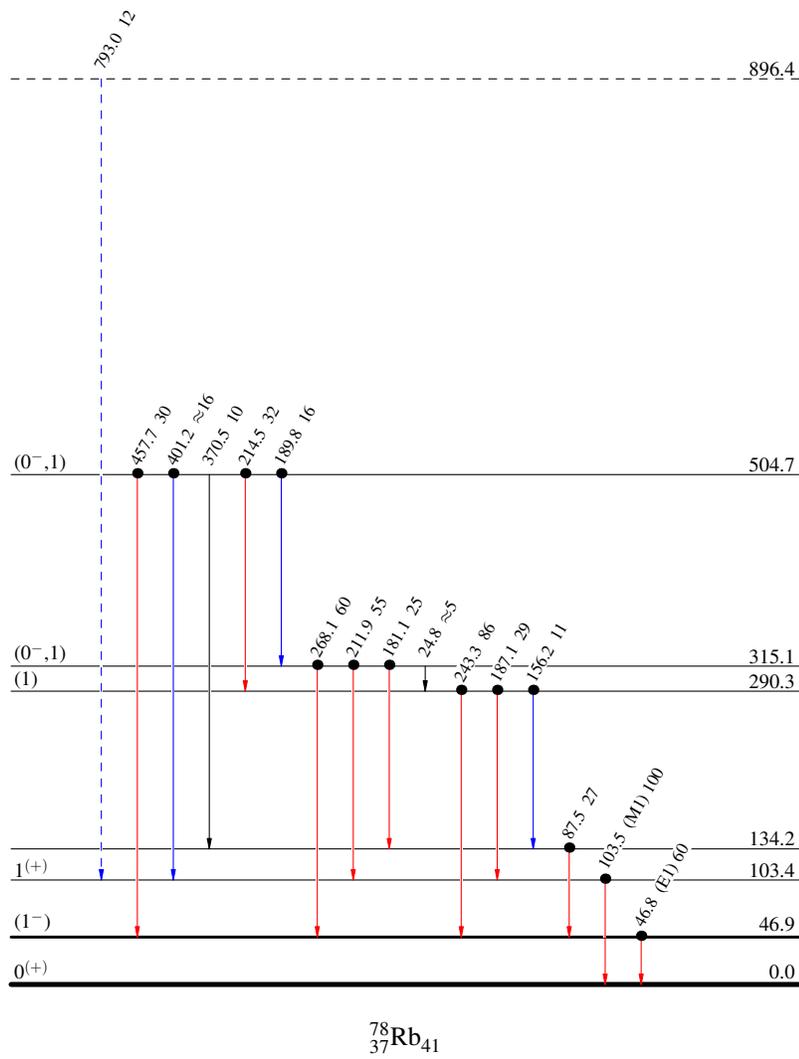
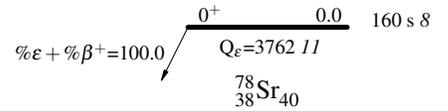
<sup>@</sup> Placement of transition in the level scheme is uncertain.

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- Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
  - $I_\gamma < 10\% \times I_\gamma^{max}$
  - $I_\gamma > 10\% \times I_\gamma^{max}$
  - - - - -→  $\gamma$  Decay (Uncertain)
  - Coincidence

Decay Scheme

Intensities: Relative  $I_\gamma$



0.91  $\mu\text{s}$  4