## $^{99}$Ru($^{48}$Ti,A2P2NG) 2008Pa36

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | P. K. Joshi, B. Singh, S. Singh, A. K. Jain | NDS 138, 1 (2016) | 15-Oct-2016 |

2008Pa36: E=240 MeV beam provided by ALPI accelerator at Legnaro. $^{114}$Sn($^{32}$S,$\alpha$2pn), E=160 MeV reaction also performed. Measured E$\gamma$, I$\gamma$, $\gamma\gamma$-coin using EUROBALL III array. Detected charged particles using ISIS array. Measured lifetimes using Doppler-Shift Attenuation method. Comparisons with Tilted-Axis Cranking (TAC) model.
2008Pa36 give B(M1) and B(E2) values. See Adopted dataset for these values deduced by the evaluators.

### $^{139}$Sm Levels

| E(level)[†] | J$^\pi$[#] | T$_{1/2}$[‡] | Comments |
|---|---|---|---|
| 0.0[@] | 1/2$^+$ | | |
| 112.0[@] *10* | 3/2$^+$ | | |
| 267.6[@] *15* | 5/2$^+$ | | |
| 457.8[&] *18* | 11/2$^-$ | 10.7 s *6* | %$\varepsilon$+%$\beta^+$=6.3 *5*; %IT=93.7 *5*<br>T$_{1/2}$ and decay modes from Adopted Levels. |
| 1047.5[&] *20* | 15/2$^-$ | | |
| 1869.9[&] *23* | 19/2$^-$ | | |
| 2819.5[&] *24* | 23/2$^-$ | | |
| 3253.4[a] *24* | 23/2$^-$ | | |
| 3325.6[a] *25* | 25/2$^-$ | | |
| 3443.8[a] *25* | 27/2$^-$ | | |
| 3708.5[a] *25* | 29/2$^-$ | 0.69 ps *+42−21* | |
| 4045.5[a] *25* | 31/2$^-$ | 0.59 ps *+15−12* | |
| 4455[a] *3* | 33/2$^-$ | 0.54 ps *+10−7* | |
| 4927[a] *3* | 35/2$^-$ | 0.34 ps *+8−6* | |
| 5440[a] *3* | 37/2$^-$ | 0.62 ps *+42−21* | |
| 5931[a] *3* | (39/2$^-$) | >0.7 ps | |

[†] From least-squares fit to E$\gamma$ data, assuming an uncertainty of 0.3 keV when not stated.
[‡] From Doppler-shift attenuation method (2008Pa36).
[#] Proposed from band structure given in 2008Pa36. For low-lying levels, the assignments are from the Adopted Levels.
[@] Band(A): The g.s. band.
[&] Band(B): 11/2$^-$ band.
[a] Band(C): $\pi h^2_{11/2}\otimes\nu h^{-1}_{11/2}$. Possibly a magnetic-rotational band with prolate or triaxial deformation.

### $\gamma$($^{139}$Sm)

| E$_\gamma$ | I$_\gamma$ | E$_i$(level) | J$_i^\pi$ | E$_f$ | J$_f^\pi$ | Mult. | $\alpha$[†] | Comments |
|---|---|---|---|---|---|---|---|---|
| 72.0 | | 3325.6 | 25/2$^-$ | 3253.4 | 23/2$^-$ | | | |
| 112.0 | | 112.0 | 3/2$^+$ | 0.0 | 1/2$^+$ | | | |
| 118.4 | | 3443.8 | 27/2$^-$ | 3325.6 | 25/2$^-$ | | | |
| 155.6 | | 267.6 | 5/2$^+$ | 112.0 | 3/2$^+$ | | | |
| 190.2 | | 457.8 | 11/2$^-$ | 267.6 | 5/2$^+$ | E3 | | Mult.: from Adopted Gammas. |
| 264.7 *2* | 24.5 *2* | 3708.5 | 29/2$^-$ | 3443.8 | 27/2$^-$ | [M1] | 0.1129 | |
| 337.0 *2* | 17.9 *17* | 4045.5 | 31/2$^-$ | 3708.5 | 29/2$^-$ | [M1] | 0.0595 | |
| 382.9 *5* | 0.9 *5* | 3708.5 | 29/2$^-$ | 3325.6 | 25/2$^-$ | [E2] | 0.0270 | |
| 409.1 *2* | 11.6 *11* | 4455 | 33/2$^-$ | 4045.5 | 31/2$^-$ | [M1] | 0.0359 | |
| 433.9 | | 3253.4 | 23/2$^-$ | 2819.5 | 23/2$^-$ | | | |
| 472.4 *2* | 7.0 *9* | 4927 | 35/2$^-$ | 4455 | 33/2$^-$ | [M1] | 0.0249 | |

Continued on next page (footnotes at end of table)

## $^{99}$Ru($^{48}$Ti,A2P2NG) 2008Pa36 (continued)

### $\gamma(^{139}Sm)$ (continued)

| $E_\gamma$ | $I_\gamma$ | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. | $\alpha^\dagger$ |
|---|---|---|---|---|---|---|---|
| 490.4 *4* | 1.1 *4* | 5931 | $(39/2^-)$ | 5440 | $37/2^-$ | [M1] | 0.0226 |
| 506.2 | | 3325.6 | $25/2^-$ | 2819.5 | $23/2^-$ | | |
| 513.5 *5* | 3.1 *7* | 5440 | $37/2^-$ | 4927 | $35/2^-$ | [M1] | 0.0201 |
| 589.7 | 100 | 1047.5 | $15/2^-$ | 457.8 | $11/2^-$ | | |
| 601.7 *4* | 3.0 *5* | 4045.5 | $31/2^-$ | 3443.8 | $27/2^-$ | [E2] | |
| 746.3 *7* | 3.4 *9* | 4455 | $33/2^-$ | 3708.5 | $29/2^-$ | [E2] | |
| 822.4 | | 1869.9 | $19/2^-$ | 1047.5 | $15/2^-$ | | |
| 881.8 *4* | 4.1 *8* | 4927 | $35/2^-$ | 4045.5 | $31/2^-$ | [E2] | |
| 949.8 | | 2819.5 | $23/2^-$ | 1869.9 | $19/2^-$ | | |
| 985.7 *6* | 2.8 *7* | 5440 | $37/2^-$ | 4455 | $33/2^-$ | [E2] | |
| 1003.2 *6* | 2.3 *5* | 5931 | $(39/2^-)$ | 4927 | $35/2^-$ | [E2] | |
| 1383.3 | | 3253.4 | $23/2^-$ | 1869.9 | $19/2^-$ | | |

$^\dagger$ 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.

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Level Scheme

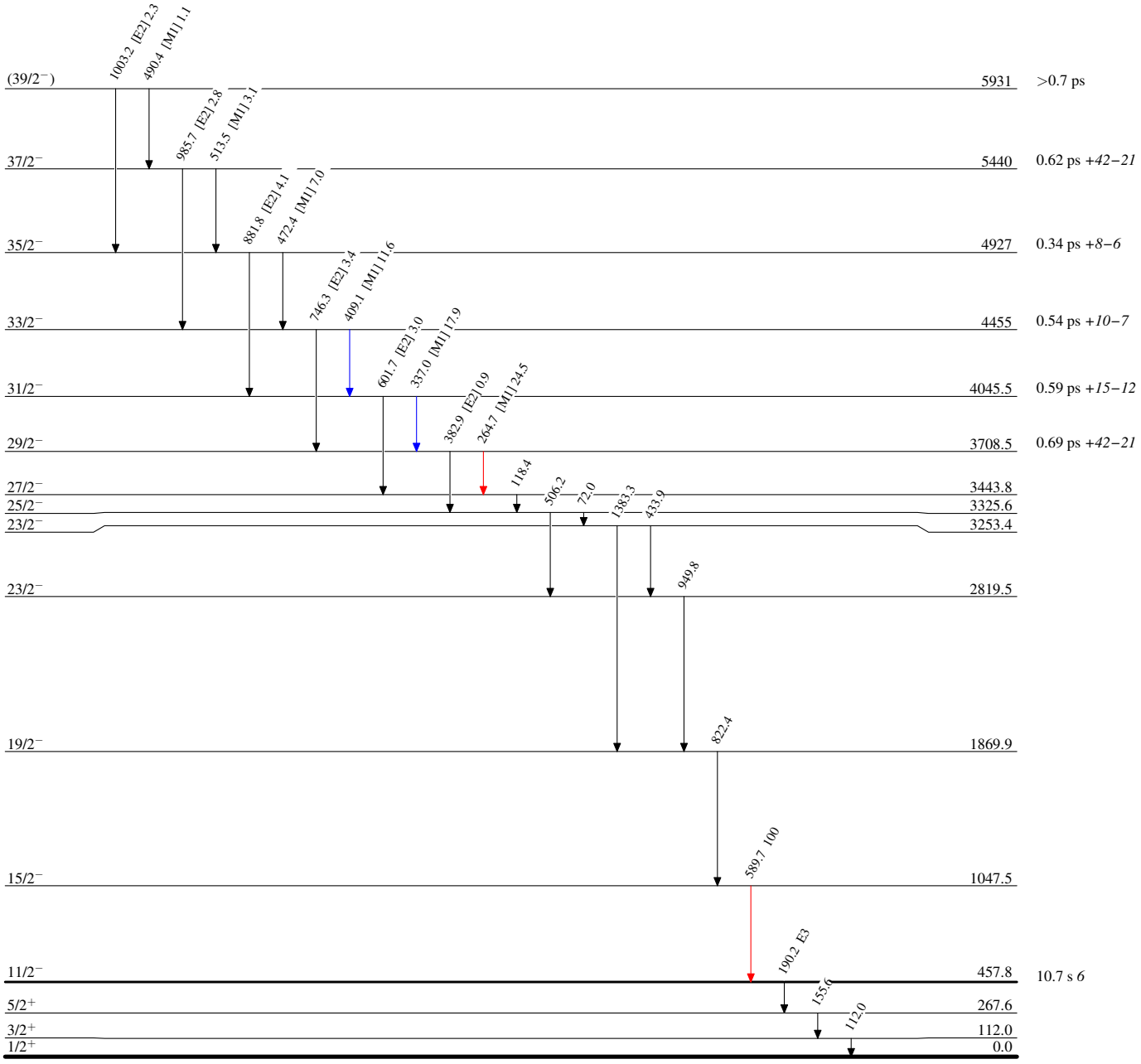
Intensities: Relative $I_\gamma$

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

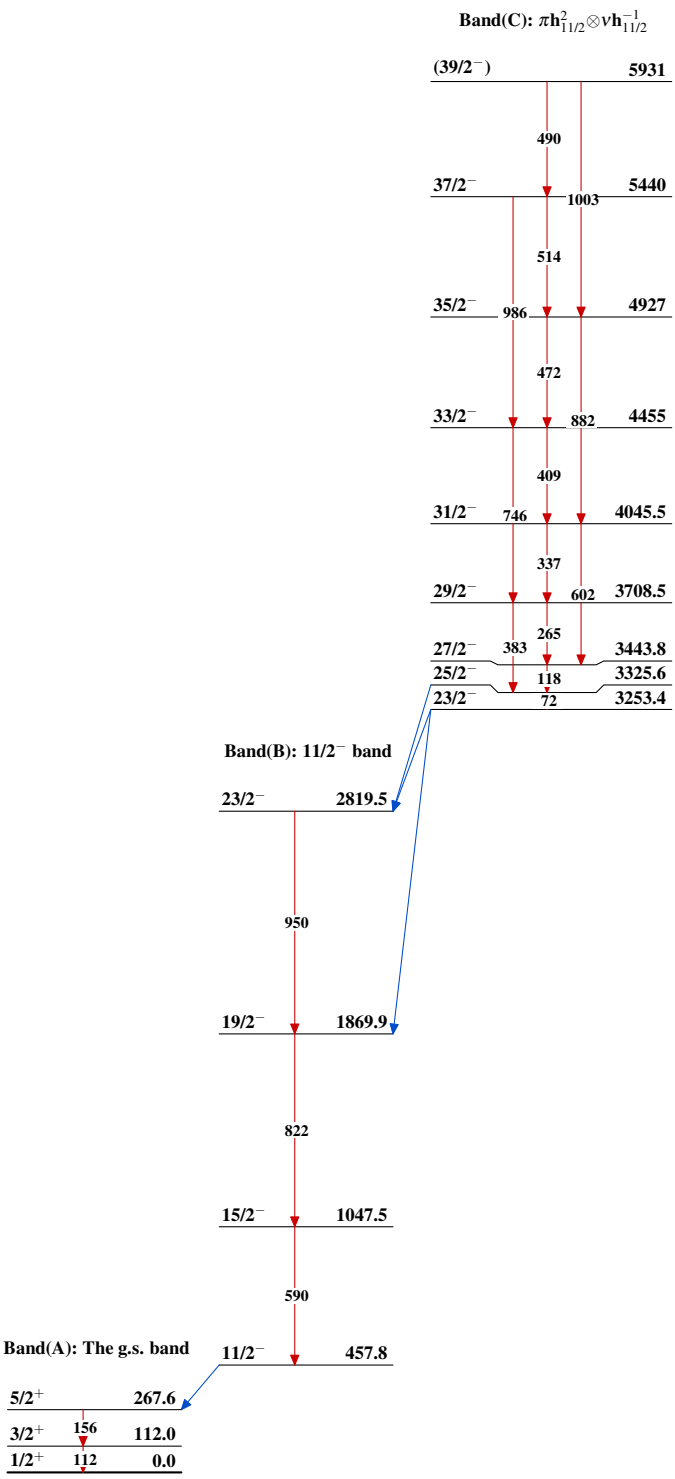
$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$




$^{139}_{62}Sm_{77}$

**$^{99}$Ru($^{48}$Ti,A2P2NG) 2008Pa36**




$^{139}_{62}Sm_{77}$