

$^{238}\text{U}(\alpha, \text{F}\gamma)$     **2002Hu07,2004Hu02**

| Type            | Author       | History<br>Citation  | Literature Cutoff Date |
|-----------------|--------------|----------------------|------------------------|
| Full Evaluation | D. De Frenne | NDS 110, 2081 (2009) | 1-Mar-2009             |

**2002Hu07,2004Hu02:** E=30 MeV. Measured  $E\gamma$ ,  $I\gamma$ ,  $\gamma\gamma$  with Rochester  $4\pi$ , highly segmented heavy-ion detector array CHICO, in coincidence with the GAMMASPHERE detector array. All data are from **2004Hu02**. They supersede the data of **2002Hu07**.

 $^{103}\text{Mo}$  Levels

| E(level)                 | $J^\pi^\dagger$ | E(level)                  | $J^\pi^\dagger$ | E(level)                  | $J^\pi^\dagger$ | E(level)                  | $J^\pi^\dagger$ |
|--------------------------|-----------------|---------------------------|-----------------|---------------------------|-----------------|---------------------------|-----------------|
| 0.0 $^\ddagger$          | 3/2 $^+$        | 850.7 $^\textcircled{a}$  | 13/2 $^-$       | 2162.3 $^\#$              | 21/2 $^+$       | 3947.7 $^\textcircled{a}$ | 29/2 $^-$       |
| 102.6 $^\#$              | 5/2 $^+$        | 859.7 $^\&$               | 15/2 $^-$       | 2165.3 $^\textcircled{a}$ | 21/2 $^-$       | 4214.9 $^\ddagger$        | 31/2 $^+$       |
| 241.3 $^\ddagger$        | 7/2 $^+$        | 901.6 $^\#$               | 13/2 $^+$       | 2492.4 $^\ddagger$        | 23/2 $^+$       | 4764.0 $^\#$              | 33/2 $^+$       |
| 346.6 $^\textcircled{a}$ | 5/2 $^-$        | 1158.7 $^\ddagger$        | 15/2 $^+$       | 2935.0 $^\#$              | 25/2 $^+$       | 4945.3 $^\textcircled{a}$ | 33/2 $^-$       |
| 352.6 $^\&$              | 7/2 $^-$        | 1406.3 $^\&$              | 19/2 $^-$       | 2957.7 $^\&$              | 27/2 $^-$       | 4982.9 $^\&$              | 35/2 $^-$       |
| 433.9 $^\#$              | 9/2 $^+$        | 1426.1 $^\textcircled{a}$ | 17/2 $^-$       | 3019.4 $^\textcircled{a}$ | 25/2 $^-$       | 5204.1 $^\ddagger$        | 35/2 $^+$       |
| 477.5 $^\textcircled{a}$ | 9/2 $^-$        | 1482.9 $^\#$              | 17/2 $^+$       | 3304.6 $^\ddagger$        | 27/2 $^+$       | 6149.2 $^\&$              | 39/2 $^-$       |
| 497.3 $^\&$              | 11/2 $^-$       | 1779.5 $^\ddagger$        | 19/2 $^+$       | 3798.7 $^\#$              | 29/2 $^+$       | 6308.6 $^\ddagger$        | 39/2 $^+$       |
| 638.4 $^\ddagger$        | 11/2 $^+$       | 2113.2 $^\&$              | 23/2 $^-$       | 3919.5 $^\&$              | 31/2 $^-$       |                           |                 |

$^\dagger$  Suggested from observed band structure and systematics. Values are the same as the adopted ones, except that the latter are enclosed in parentheses.

$^\ddagger$  Band(A):  $\nu 3/2[411]$ ,  $\alpha = -1/2$ .

$^\#$  Band(a):  $\nu 3/2[411]$ ,  $\alpha = +1/2$ .

$^\textcircled{a}$  Band(B):  $\nu 5/2[532]$ ,  $\alpha = +1/2$ .

$^\&$  Band(b):  $\nu 5/2[532]$ ,  $\alpha = -1/2$ .

 $\gamma(^{103}\text{Mo})$ 

| $E_\gamma$        | $E_i(\text{level})$ | $J_i^\pi$ | $E_f$  | $J_f^\pi$ | $E_\gamma$        | $E_i(\text{level})$ | $J_i^\pi$ | $E_f$  | $J_f^\pi$ |
|-------------------|---------------------|-----------|--------|-----------|-------------------|---------------------|-----------|--------|-----------|
| 102.6 $^\ddagger$ | 102.6               | 5/2 $^+$  | 0.0    | 3/2 $^+$  | 362.4             | 859.7               | 15/2 $^-$ | 497.3  | 11/2 $^-$ |
| 111.3 $^\ddagger$ | 352.6               | 7/2 $^-$  | 241.3  | 7/2 $^+$  | 373.2             | 850.7               | 13/2 $^-$ | 477.5  | 9/2 $^-$  |
| 124.9 $^\ddagger$ | 477.5               | 9/2 $^-$  | 352.6  | 7/2 $^-$  | 382.8 $^\ddagger$ | 2162.3              | 21/2 $^+$ | 1779.5 | 19/2 $^+$ |
| 130.9             | 477.5               | 9/2 $^-$  | 346.6  | 5/2 $^-$  | 397.1             | 638.4               | 11/2 $^+$ | 241.3  | 7/2 $^+$  |
| 138.7 $^\ddagger$ | 241.3               | 7/2 $^+$  | 102.6  | 5/2 $^+$  | 467.7             | 901.6               | 13/2 $^+$ | 433.9  | 9/2 $^+$  |
| 144.7             | 497.3               | 11/2 $^-$ | 352.6  | 7/2 $^-$  | 520.3             | 1158.7              | 15/2 $^+$ | 638.4  | 11/2 $^+$ |
| 192.6 $^\ddagger$ | 433.9               | 9/2 $^+$  | 241.3  | 7/2 $^+$  | 546.6             | 1406.3              | 19/2 $^-$ | 859.7  | 15/2 $^-$ |
| 204.5 $^\ddagger$ | 638.4               | 11/2 $^+$ | 433.9  | 9/2 $^+$  | 575.4             | 1426.1              | 17/2 $^-$ | 850.7  | 13/2 $^-$ |
| 236.2 $^\ddagger$ | 477.5               | 9/2 $^-$  | 241.3  | 7/2 $^+$  | 581.3             | 1482.9              | 17/2 $^+$ | 901.6  | 13/2 $^+$ |
| 241.3             | 241.3               | 7/2 $^+$  | 0.0    | 3/2 $^+$  | 620.8             | 1779.5              | 19/2 $^+$ | 1158.7 | 15/2 $^+$ |
| 250.0 $^\ddagger$ | 352.6               | 7/2 $^-$  | 102.6  | 5/2 $^+$  | 679.4             | 2162.3              | 21/2 $^+$ | 1482.9 | 17/2 $^+$ |
| 257.1 $^\ddagger$ | 1158.7              | 15/2 $^+$ | 901.6  | 13/2 $^+$ | 706.9             | 2113.2              | 23/2 $^-$ | 1406.3 | 19/2 $^-$ |
| 263.2 $^\ddagger$ | 901.6               | 13/2 $^+$ | 638.4  | 11/2 $^+$ | 712.9             | 2492.4              | 23/2 $^+$ | 1779.5 | 19/2 $^+$ |
| 296.6 $^\ddagger$ | 1779.5              | 19/2 $^+$ | 1482.9 | 17/2 $^+$ | 739.2             | 2165.3              | 21/2 $^-$ | 1426.1 | 17/2 $^-$ |
| 324.2 $^\ddagger$ | 1482.9              | 17/2 $^+$ | 1158.7 | 15/2 $^+$ | 772.7             | 2935.0              | 25/2 $^+$ | 2162.3 | 21/2 $^+$ |
| 331.3             | 433.9               | 9/2 $^+$  | 102.6  | 5/2 $^+$  | 812.2             | 3304.6              | 27/2 $^+$ | 2492.4 | 23/2 $^+$ |
| 346.6 $^\ddagger$ | 346.6               | 5/2 $^-$  | 0.0    | 3/2 $^+$  | 844.5             | 2957.7              | 27/2 $^-$ | 2113.2 | 23/2 $^-$ |
| 353.4 $^\ddagger$ | 850.7               | 13/2 $^-$ | 497.3  | 11/2 $^-$ | 854.1             | 3019.4              | 25/2 $^-$ | 2165.3 | 21/2 $^-$ |

Continued on next page (footnotes at end of table)

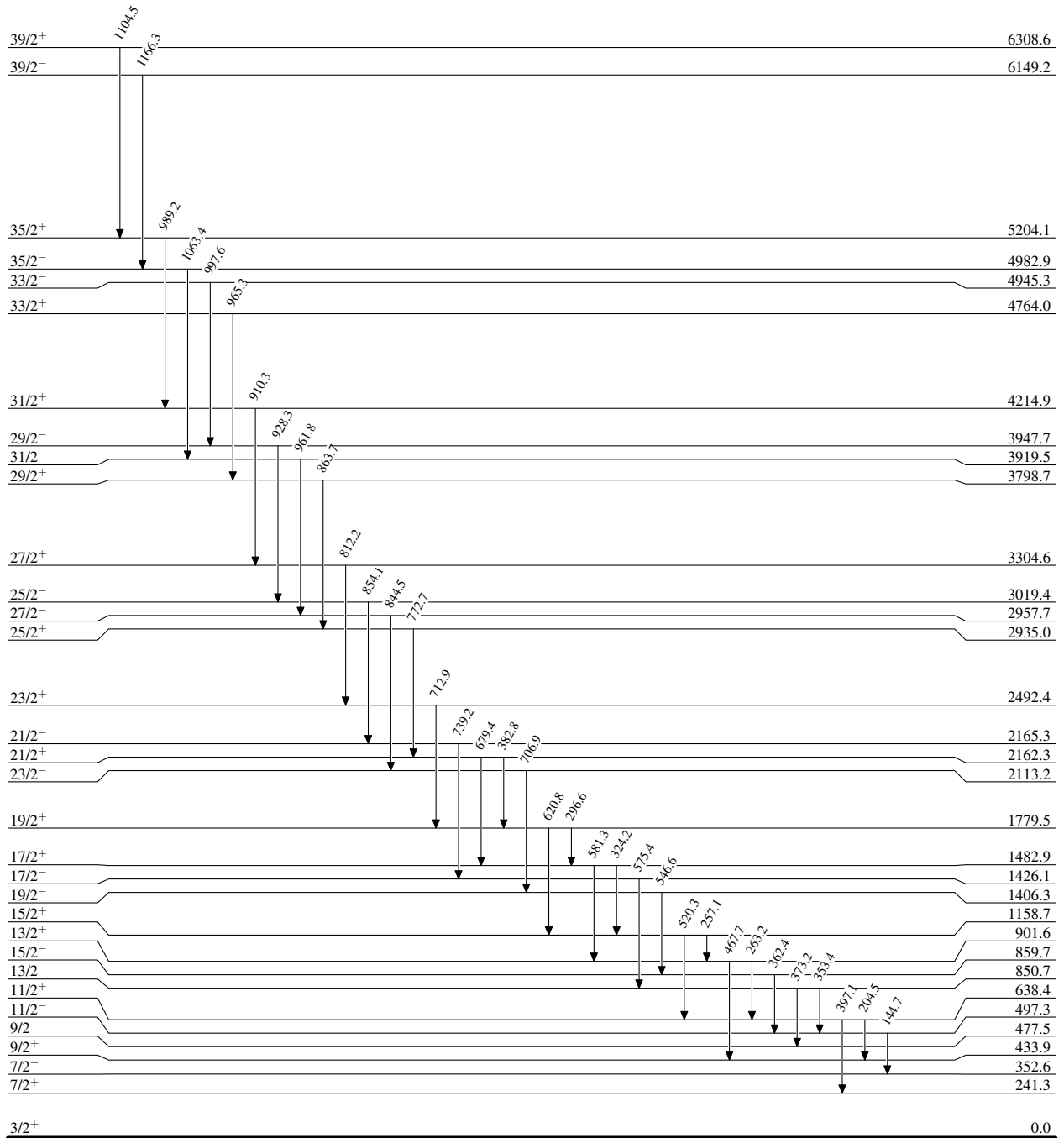
$^{238}\text{U}(\alpha, \text{F}\gamma)$  [2002Hu07](#), [2004Hu02](#) (continued) $\gamma(^{103}\text{Mo})$  (continued)

| $E_\gamma$ | $E_i(\text{level})$ | $J_i^\pi$         | $E_f$  | $J_f^\pi$         | $E_\gamma$ | $E_i(\text{level})$ | $J_i^\pi$         | $E_f$  | $J_f^\pi$         |
|------------|---------------------|-------------------|--------|-------------------|------------|---------------------|-------------------|--------|-------------------|
| 863.7      | 3798.7              | 29/2 <sup>+</sup> | 2935.0 | 25/2 <sup>+</sup> | 989.2      | 5204.1              | 35/2 <sup>+</sup> | 4214.9 | 31/2 <sup>+</sup> |
| 910.3      | 4214.9              | 31/2 <sup>+</sup> | 3304.6 | 27/2 <sup>+</sup> | 997.6      | 4945.3              | 33/2 <sup>-</sup> | 3947.7 | 29/2 <sup>-</sup> |
| 928.3      | 3947.7              | 29/2 <sup>-</sup> | 3019.4 | 25/2 <sup>-</sup> | 1063.4     | 4982.9              | 35/2 <sup>-</sup> | 3919.5 | 31/2 <sup>-</sup> |
| 961.8      | 3919.5              | 31/2 <sup>-</sup> | 2957.7 | 27/2 <sup>-</sup> | 1104.5     | 6308.6              | 39/2 <sup>+</sup> | 5204.1 | 35/2 <sup>+</sup> |
| 965.3      | 4764.0              | 33/2 <sup>+</sup> | 3798.7 | 29/2 <sup>+</sup> | 1166.3     | 6149.2              | 39/2 <sup>-</sup> | 4982.9 | 35/2 <sup>-</sup> |

<sup>†</sup> From level-energy difference; value not quoted by [2004Hu02](#).

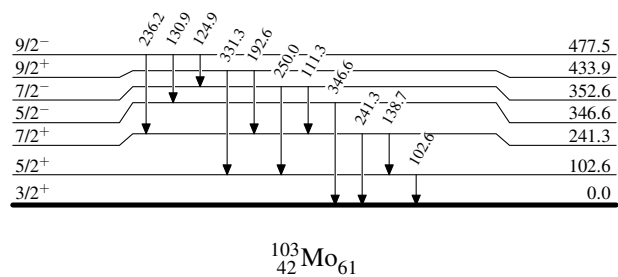
$^{238}\text{U}(\alpha, \text{F}\gamma)$  2002Hu07,2004Hu02

## Level Scheme

 $^{103}_{42}\text{Mo}_{61}$

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Level Scheme (continued)



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