

²³⁸U(α,Fγ) **2004Wu08**

Type	Author	History	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	Citation NDS 145, 25 (2017)	1-Jul-2017

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Measured E_γ, I_γ, γγ, (fission fragment)γ coin using a 4π segmented heavy-ion detector array CHICO in coin with γ rays detected with the GAMMASPHERE array.

⁹⁹Zr Levels

E(level)	J ^π	E(level)	J ^π	E(level)	J ^π	E(level)	J ^π
0.0	1/2 ⁺	1065.4 [†]	7/2 ⁺	2104.9&	17/2 ⁺	3583.0@	25/2 ⁻
121.8	3/2 ⁺	1235.5 [#]	15/2 ⁻	2207.9 [†]	15/2 ⁺	3639.2&	25/2 ⁺
251.9	7/2 ⁺	1257.1&	11/2 ⁺	2447.4&	19/2 ⁺	3753.5 [†]	23/2 ⁺
614.2 [#]	3/2 ⁻	1278.7@	13/2 ⁻	2515.3 [#]	23/2 ⁻	4091.0&	27/2 ⁺
658.0 [†]	3/2 ⁺	1322.0 [‡]	9/2 ⁺	2555.0 [‡]	17/2 ⁺	4132.6 [‡]	25/2 ⁺
667.4@	5/2 ⁻	1507.9&	13/2 ⁺	2657.0@	21/2 ⁻	4319.5 [#]	31/2 ⁻
678.6 [#]	7/2 ⁻	1585.3 [†]	11/2 ⁺	2817.0&	21/2 ⁺	4627.0@	29/2 ⁻
820.8 [#]	11/2 ⁻	1791.3&	15/2 ⁺	2934.3 [†]	19/2 ⁺	5039.2 [‡]	29/2 ⁺
850.4 [‡]	5/2 ⁺	1801.7 [#]	19/2 ⁻	3215.7&	23/2 ⁺	5390.4 [#]	35/2 ⁻
867.1@	9/2 ⁻	1882.8@	17/2 ⁻	3299.8 [‡]	21/2 ⁺	5734.3@	33/2 ⁻
1038.8&	9/2 ⁺	1891.7 [‡]	13/2 ⁺	3359.5 [#]	27/2 ⁻	6565.7 [#]	39/2 ⁻

- [†] Band(A): Band based on 3/2⁺, α=-1/2.
- [‡] Band(a): Band based on 5/2⁺, α=+1/2.
- [#] Band(B): Band based on 3/2⁻, α=-1/2.
- @ Band(b): Band based on 5/2⁻, α=+1/2.
- & Band(C): 9/2[404] band.

γ(⁹⁹Zr)

E _i (level)	J _i ^π	E _γ	I _γ [‡]	E _f	J _f ^π	E _i (level)	J _i ^π	E _γ	I _γ [‡]	E _f	J _f ^π
121.8	3/2 ⁺	121.8		0.0	1/2 ⁺	1257.1	11/2 ⁺	218	1	1038.8	9/2 ⁺
251.9	7/2 ⁺	130.3 [†]		121.8	3/2 ⁺	1278.7	13/2 ⁻	411.6	10	867.1	9/2 ⁻
614.2	3/2 ⁻	614.2		0.0	1/2 ⁺			457.9	38	820.8	11/2 ⁻
658.0	3/2 ⁺	406.1		251.9	7/2 ⁺	1322.0	9/2 ⁺	256.6	10	65	4
		536.2		121.8	3/2 ⁺			471.6	10	100	
										850.4	5/2 ⁺
667.4	5/2 ⁻	53.2 [†]		614.2	3/2 ⁻	1507.9	13/2 ⁺	251	1	1257.1	11/2 ⁺
678.6	7/2 ⁻	64.4 [†]		614.2	3/2 ⁻			469	1	1038.8	9/2 ⁺
820.8	11/2 ⁻	142	1	678.6	7/2 ⁻	1585.3	11/2 ⁺	520	1	1065.4	7/2 ⁺
850.4	5/2 ⁺	192.4		658.0	3/2 ⁺	1791.3	15/2 ⁺	283	1	1507.9	13/2 ⁺
867.1	9/2 ⁻	188.5	143	678.6	7/2 ⁻			534	1	1257.1	11/2 ⁺
		199.7	10	667.4	5/2 ⁻	1801.7	19/2 ⁻	566	1	1235.5	15/2 ⁻
1038.8	9/2 ⁺	188.5 [†]		850.4	5/2 ⁺	1882.8	17/2 ⁻	604	1	1278.7	13/2 ⁻
		360.1 [†]		678.6	7/2 ⁻	1891.7	13/2 ⁺	570	1	1322.0	9/2 ⁺
		381.1 [†]		658.0	3/2 ⁺	2104.9	17/2 ⁺	314	1	1791.3	15/2 ⁺
		786.8 [†]		251.9	7/2 ⁺			597	1	1507.9	13/2 ⁺
1065.4	7/2 ⁺	215.0	73	850.4	5/2 ⁺	2207.9	15/2 ⁺	623	1	1585.3	11/2 ⁺
		407.4	10	658.0	3/2 ⁺	2447.4	19/2 ⁺	343	1	2104.9	17/2 ⁺
				820.8	11/2 ⁻			656	1	1791.3	15/2 ⁺
1235.5	15/2 ⁻	415	1								

Continued on next page (footnotes at end of table)

${}^{238}\text{U}(\alpha, \text{F}\gamma)$ **2004Wu08** (continued) $\gamma({}^{99}\text{Zr})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ	E_f	J_f^π	$E_i(\text{level})$	J_i^π	E_γ	E_f	J_f^π
2515.3	23/2 ⁻	714 <i>I</i>	1801.7	19/2 ⁻	3639.2	25/2 ⁺	822 <i>I</i>	2817.0	21/2 ⁺
2555.0	17/2 ⁺	663 <i>I</i>	1891.7	13/2 ⁺	3753.5	23/2 ⁺	819 <i>I</i>	2934.3	19/2 ⁺
2657.0	21/2 ⁻	774 <i>I</i>	1882.8	17/2 ⁻	4091.0	27/2 ⁺	875 <i>I</i>	3215.7	23/2 ⁺
2817.0	21/2 ⁺	370 <i>I</i>	2447.4	19/2 ⁺	4132.6	25/2 ⁺	833 <i>I</i>	3299.8	21/2 ⁺
		712 <i>I</i>	2104.9	17/2 ⁺	4319.5	31/2 ⁻	960 <i>I</i>	3359.5	27/2 ⁻
2934.3	19/2 ⁺	726 <i>I</i>	2207.9	15/2 ⁺	4627.0	29/2 ⁻	1044 <i>I</i>	3583.0	25/2 ⁻
3215.7	23/2 ⁺	768 <i>I</i>	2447.4	19/2 ⁺	5039.2	29/2 ⁺	907 <i>I</i>	4132.6	25/2 ⁺
3299.8	21/2 ⁺	745 <i>I</i>	2555.0	17/2 ⁺	5390.4	35/2 ⁻	1071 <i>I</i>	4319.5	31/2 ⁻
3359.5	27/2 ⁻	844 <i>I</i>	2515.3	23/2 ⁻	5734.3	33/2 ⁻	1107 <i>I</i>	4627.0	29/2 ⁻
3583.0	25/2 ⁻	926 <i>I</i>	2657.0	21/2 ⁻	6565.7	39/2 ⁻	1175 <i>I</i>	5390.4	35/2 ⁻

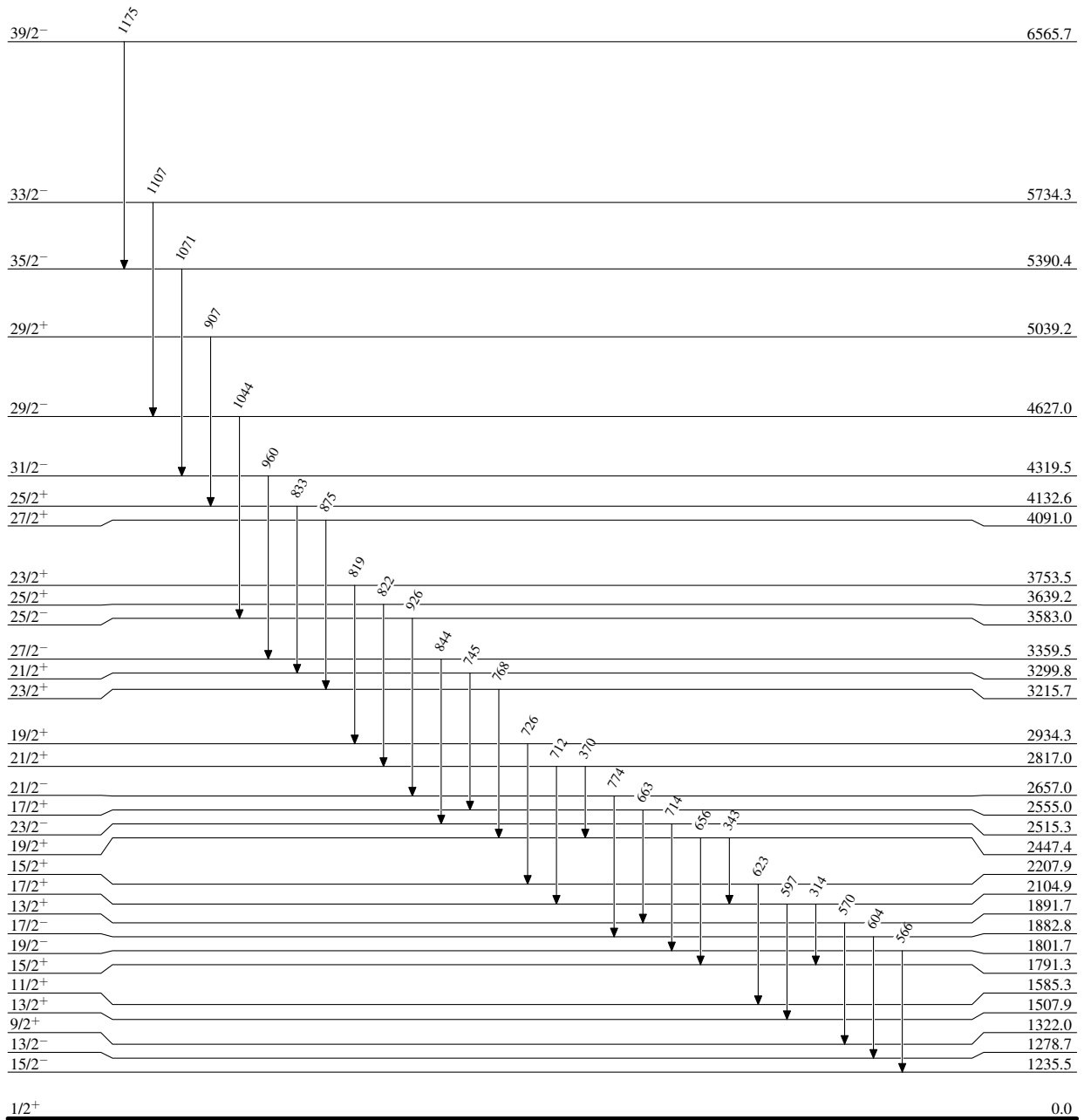
† From Adopted Gammas.

‡ Uncertainties are statistical, systematic error could be 30% for weak γ rays.

${}^{238}\text{U}(\alpha, F\gamma)$ 2004Wu08

Level Scheme

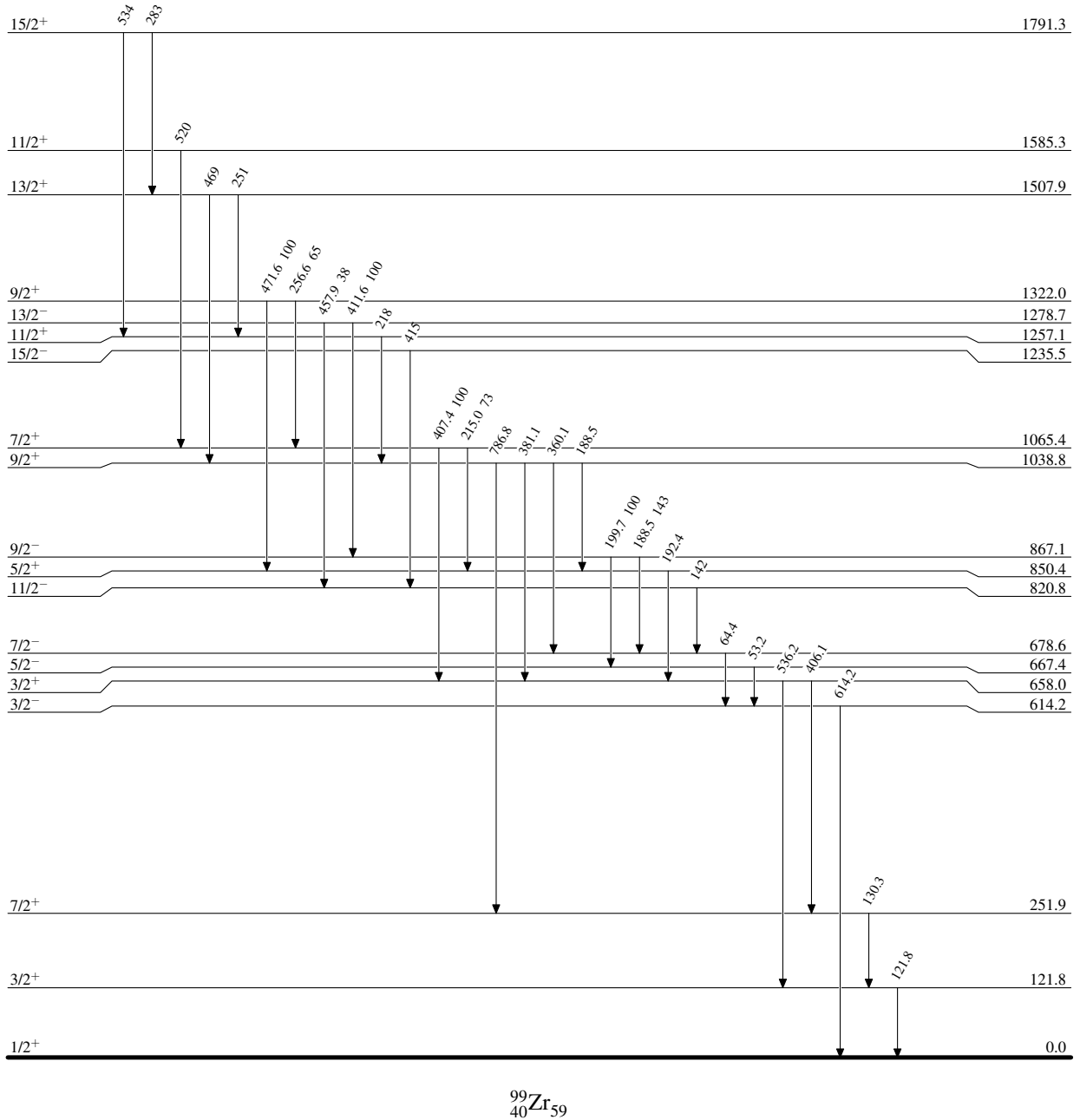
Intensities: Relative photon branching from each level

 ${}^{99}_{40}\text{Zr}_{59}$

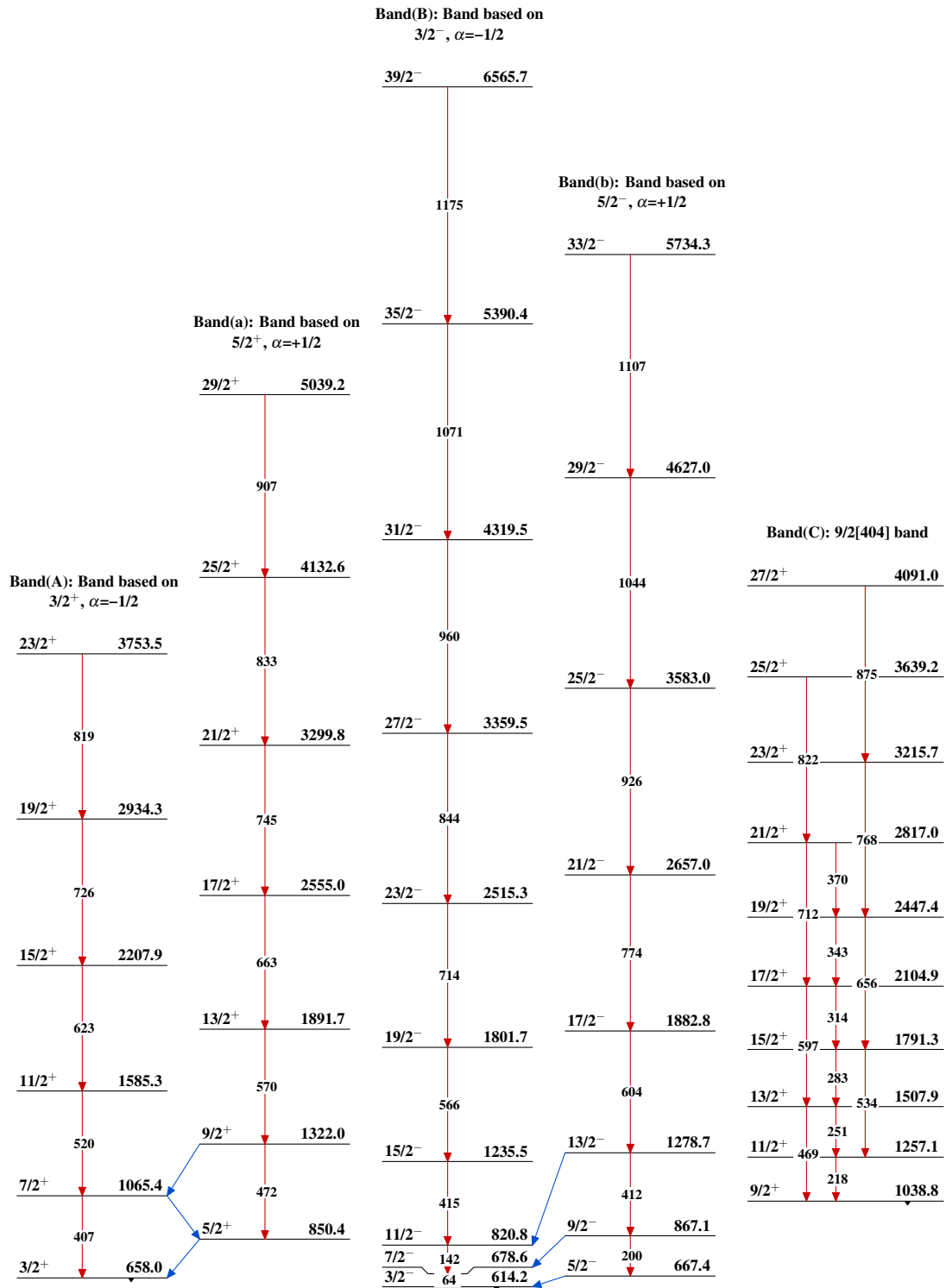
$^{238}\text{U}(\alpha, F\gamma)$ 2004Wu08

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{99}_{40}\text{Zr}_{59}$

$^{238}\text{U}(\alpha, \text{F}\gamma)$ 2004Wu08 $^{99}_{40}\text{Zr}_{59}$