

$^{168}\text{Er}(\text{d},2\text{n}\gamma)$ ,  $^{165}\text{Ho}(\alpha,\text{n}\gamma)$  1995Si20

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111, 1807 (2010)	15-Jun-2010

$^{168}\text{Er}(\text{d},2\text{n}\gamma)$ : ED=14 MeV; 95% enriched  $^{168}\text{Er}$  target; Ge detectors; measured excit (10 MeV *I* 616 MeV),  $\gamma\gamma$  coin,  $\gamma(\theta)$  (7 angles,  $\theta=0^\circ-90^\circ$ ).

$^{165}\text{Ho}(\alpha,\text{n}\gamma)$ :  $E\alpha=18$  MeV, Ge detectors; measured  $E\gamma$  for principal  $^{168}\text{Tm}$  transitions to confirm their assignment to  $^{168}\text{Tm}$ .

 $^{168}\text{Tm}$  Levels

E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	Comments
0.0 <sup>#</sup>	3 <sup>+</sup>	
2.8? <sup>@</sup> 10	(1) <sup>-</sup>	$J^\pi$ : from Adopted Levels.
41? <sup>@</sup> 1	(2) <sup>-</sup>	E(level), $J^\pi$ : from Adopted Levels.
64.37 <sup>#</sup> 5	(4) <sup>+</sup>	
112? <sup>@</sup> 1	(3) <sup>-</sup>	E(level), $J^\pi$ : from Adopted Levels.
144.69 <sup>#</sup> 7	(5) <sup>+</sup>	
148.38 <sup>&amp;</sup> 6	(4) <sup>+</sup>	
178.7? <sup>@</sup> 10	(4) <sup>-</sup>	
193.29 <sup>a</sup> 6	(4) <sup>-</sup>	
203.71 <sup>a</sup> 11	(3) <sup>-</sup>	
229.08 <sup>&amp;</sup> 8	(5) <sup>+</sup>	
242.02 <sup>#</sup> 11	(6) <sup>+</sup>	
247.06 <sup>a</sup> 9	(5) <sup>-</sup>	
314.12 <sup>a</sup> 10	(6) <sup>-</sup>	
327.74 <sup>&amp;</sup> 8	(6) <sup>+</sup>	
337.80 <sup>b</sup> 7	(4) <sup>-</sup>	
348.90 <sup>#</sup> 10	(7) <sup>+</sup>	band assignment not adopted; the $K^\pi=3^+$ band has been extended beyond J=20 using the ( $^{11}\text{B},\alpha 3\text{n}\gamma$ ) reaction (2007CaZW) and the J=7 member of that band lies At 358 keV.
391.71 <sup>a</sup> 13	(7) <sup>-</sup>	
392.1? <sup>@</sup> 10	(6) <sup>-</sup>	
442.25 <sup>&amp;</sup> 9	(7) <sup>+</sup>	
446.35 <sup>b</sup> 10	(5) <sup>-</sup>	
484.23 <sup>a</sup> 13	(8) <sup>-</sup>	
564.89 <sup>b</sup> 9	(6) <sup>-</sup>	
577.80? <sup>&amp;</sup> 9	(8) <sup>+</sup>	
675.1? <sup>@</sup> 10	(8) <sup>-</sup>	
755.61 <sup>a</sup> 14	(10) <sup>-</sup>	
1097.31 <sup>a</sup> 17	(12) <sup>-</sup>	

<sup>†</sup> From least-squares fit to  $E\gamma$ , while holding fixed the energies of the 41 and 112 levels At the adopted values (i.e., 41 *I* and 112 *I*).

<sup>‡</sup> Authors' suggested values.

<sup>#</sup> Band(A):  $K^\pi=3^+$  g.s. band. Configuration: ( $\nu$  7/2[633])-( $\pi$  1/2[411]).

<sup>@</sup> Band(B): tentative  $K^\pi=1^-$  band. Configuration: ( $\nu$  1/2[521])+( $\pi$  1/2[411]).

<sup>&</sup> Band(C):  $K^\pi=(4^+)$  band. Configuration: ( $\nu$  7/2[633])+( $\pi$  1/2[411]).

<sup>a</sup> Band(D):  $K^\pi=(3^-)$  band. Configuration: ( $\nu$  7/2[633])-( $\pi$  1/2[541]).

<sup>b</sup> Band(E):  $K^\pi=(4^-)$  band. Configuration: ( $\nu$  7/2[633])+( $\pi$  1/2[541]).

$^{168}\text{Er}(d,2n\gamma)$ ,  $^{165}\text{Ho}(\alpha,n\gamma)$  **1995Si20 (continued)**

						$\gamma(^{168}\text{Tm})$		
$E_\gamma$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments		
64.37 5	100 10	64.37	(4) <sup>+</sup>	0.0	3 <sup>+</sup>			
67.06 6	14 2	314.12	(6) <sup>-</sup>	247.06	(5) <sup>-</sup>			
80.53# 6	64# 6	144.69	(5) <sup>+</sup>	64.37	(4) <sup>+</sup>	I <sub>γ</sub> : γ is doubly-placed; however, γγ coin data indicate that most of the intensity belongs with this placement.		
80.53# 6	#	229.08	(5) <sup>+</sup>	148.38	(4) <sup>+</sup>	I <sub>γ</sub> : see comment on 80.53γ from 145 level.		
84.42‡ 6	32 3	229.08	(5) <sup>+</sup>	144.69	(5) <sup>+</sup>			
97.09@ 6	9 1	242.02	(6) <sup>+</sup>	144.69	(5) <sup>+</sup>			
98.69 6	61 6	327.74	(6) <sup>+</sup>	229.08	(5) <sup>+</sup>			
109.16@ 19	18 2	112?	(3) <sup>-</sup>	2.8?	(1) <sup>-</sup>			
114.45 5	15 2	442.25	(7) <sup>+</sup>	327.74	(6) <sup>+</sup>			
120.82 12	21 2	314.12	(6) <sup>-</sup>	193.29	(4) <sup>-</sup>			
135.49@ 5	6 1	577.80?	(8) <sup>+</sup>	442.25	(7) <sup>+</sup>	I <sub>γ</sub> : contaminated by $^{169}\text{Tm}$ and/or $^{167}\text{Tm}$ G.		
137.73@ 7	62 6	178.7?	(4) <sup>-</sup>	41?	(2) <sup>-</sup>			
139.34 9	9 1	203.71	(3) <sup>-</sup>	64.37	(4) <sup>+</sup>			
144.74 8	27 3	144.69	(5) <sup>+</sup>	0.0	3 <sup>+</sup>	I <sub>γ</sub> : a small fraction of this intensity belongs with 145γ that deexcites the 392 level.		
144.74@ 8		391.71	(7) <sup>-</sup>	247.06	(5) <sup>-</sup>	I <sub>γ</sub> : only a small fraction of I(145γ)=27 3 belongs with this placement.		
148.39 7	60 6	148.38	(4) <sup>+</sup>	0.0	3 <sup>+</sup>			
149.69 8	16 2	391.71	(7) <sup>-</sup>	242.02	(6) <sup>+</sup>			
169.2‡@ 2	2.0 2	314.12	(6) <sup>-</sup>	144.69	(5) <sup>+</sup>	I <sub>γ</sub> : contaminated by γ from $^{169}\text{Tm}$ and/or $^{167}\text{Tm}$ .		
170.11 8	11 1	484.23	(8) <sup>-</sup>	314.12	(6) <sup>-</sup>			
177.65 9	54 5	242.02	(6) <sup>+</sup>	64.37	(4) <sup>+</sup>			
179.31 8	34 4	327.74	(6) <sup>+</sup>	148.38	(4) <sup>+</sup>			
182.69 10	30 3	247.06	(5) <sup>-</sup>	64.37	(4) <sup>+</sup>			
189.46 6	7 1	337.80	(4) <sup>-</sup>	148.38	(4) <sup>+</sup>			
193.29 6	49 5	193.29	(4) <sup>-</sup>	0.0	3 <sup>+</sup>			
204.21 7	34 3	348.90	(7) <sup>+</sup>	144.69	(5) <sup>+</sup>			
213.32@ 3	42 4	392.1?	(6) <sup>-</sup>	178.7?	(4) <sup>-</sup>			
213.32@ 1		442.25	(7) <sup>+</sup>	229.08	(5) <sup>+</sup>	E <sub>γ</sub> , I <sub>γ</sub> : contaminated by γ from $^{169}\text{Tm}$ and/or $^{167}\text{Tm}$ ; from γγ coin, only a small fraction of I <sub>γ</sub> ≈42 belongs with this placement.		
217.27 6	7 1	446.35	(5) <sup>-</sup>	229.08	(5) <sup>+</sup>			
227.09 5	10 1	564.89	(6) <sup>-</sup>	337.80	(4) <sup>-</sup>			
250.17@ 7	11 1	577.80?	(8) <sup>+</sup>	327.74	(6) <sup>+</sup>			
271.38 5	10 1	755.61	(10) <sup>-</sup>	484.23	(8) <sup>-</sup>			
283.00@ 9	8 1	675.1?	(8) <sup>-</sup>	392.1?	(6) <sup>-</sup>			
337.7 1	12 1	337.80	(4) <sup>-</sup>	0.0	3 <sup>+</sup>			
341.7 1	15 2	1097.31	(12) <sup>-</sup>	755.61	(10) <sup>-</sup>			

† Relative intensity At 55° for  $^{168}\text{Er}(d,2n\gamma)$  At E=14 MEV..

‡ Placement based on energy sums.

# Multiply placed with undivided intensity.

@ Placement of transition in the level scheme is uncertain.

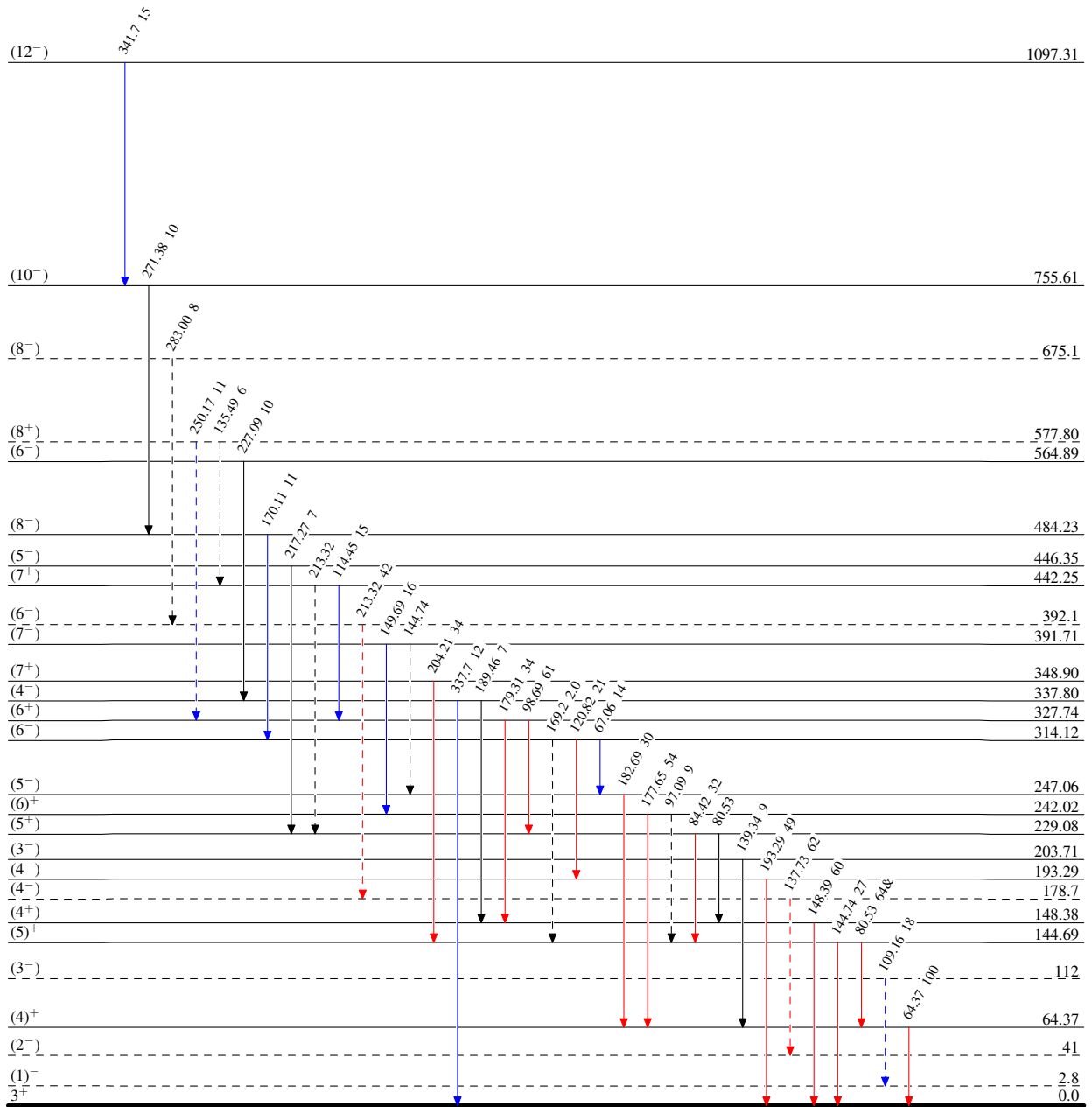
$^{168}\text{Er}(d,2n\gamma), ^{165}\text{Ho}(\alpha,n\gamma)$  1995Si20

Level Scheme

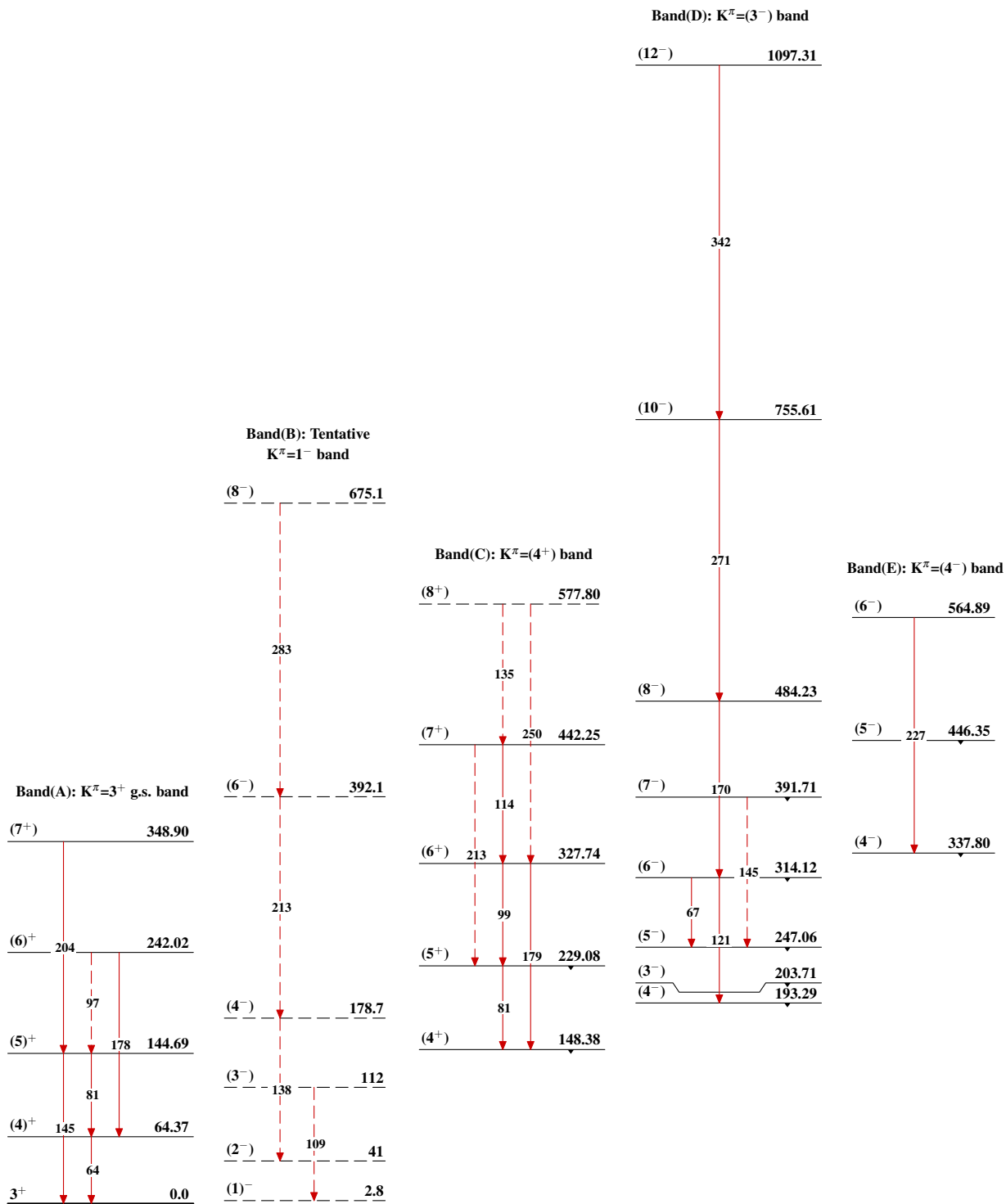
Intensities: Relative  $I_\gamma$   
& Multiply placed: undivided intensity given

Legend

- ▶  $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- ▶  $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- ▶  $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
- - -▶  $\gamma$  Decay (Uncertain)



$^{168}\text{Tm}_{99}$

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