

**$^{92}\text{Mo}(^{40}\text{Ca},\alpha p n\gamma)$     2002Ha20,2001Pe17**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	H. Iimura, J. Katakura, S. Ohya		NDS 180, 1 (2022)	1-Oct-2021

**2001Pe17:** E=190 MeV. Measured  $E\gamma$ ,  $\gamma\gamma$  and DCO'S using GASP array, ISIS ball for charged particle detection and recoil mass spectrometer (RMS) CAMEL.

**2002Ha20, 2001Ha16:** E=170 MeV. Measured  $E\gamma$ ,  $\gamma\gamma$  using CLARION detector array in conjunction with the CsI portion of the charged particle detector array HyBall, and the Recoil Mass Spectrometer (RMS). CLARION array consisted of 11 clover Ge detectors and 10 smaller single-crystal HPGe detectors. E=184 MeV. Measured  $E\gamma$ ,  $\gamma\gamma$  using GAMMASPHERE spectrometer comprised of 99 suppressed Ge detectors in conjunction with the MICROBALL CsI array.

 **$^{126}\text{Pr}$  Levels**

E(level)	$J^\pi$	Comments
0+x		
0+y <sup>@</sup>	(6 <sup>+</sup> )	<a href="#">Additional information 1.</a>
68.2+y <sup>#</sup> 10	(7 <sup>+</sup> )	<a href="#">Additional information 2.</a>
105.5+x <sup>‡</sup> 5	(5 <sup>+</sup> )	
173.6+y <sup>@</sup> 11	(8 <sup>+</sup> )	
273.3+x <sup>‡</sup> 6	(7 <sup>+</sup> )	
316.6+y <sup>#</sup> 11	(9 <sup>+</sup> )	
484.0+y <sup>@</sup> 11	(10 <sup>+</sup> )	
553.2+x <sup>‡</sup> 6	(9 <sup>+</sup> )	
694.5+y <sup>#</sup> 11	(11 <sup>+</sup> )	
920.0+y <sup>@</sup> 11	(12 <sup>+</sup> )	
946.3+x <sup>‡</sup> 6	(11 <sup>+</sup> )	
1193.8+y <sup>#</sup> 11	(13 <sup>+</sup> )	
1445.1+x <sup>‡</sup> 7	(13 <sup>+</sup> )	
1477.7+y <sup>@</sup> 11	(14 <sup>+</sup> )	
1805.3+y <sup>#</sup> 11	(15 <sup>+</sup> )	
2039.6+x <sup>‡</sup> 7	(15 <sup>+</sup> )	
2148.6+y <sup>@</sup> 11	(16 <sup>+</sup> )	
2517.8+y <sup>#</sup> 11	(17 <sup>+</sup> )	
2721.5+x <sup>‡</sup> 7	(17 <sup>+</sup> )	
2921.0+y <sup>@</sup> 11	(18 <sup>+</sup> )	
3320.0+y <sup>#</sup> 11	(19 <sup>+</sup> )	
3485.2+x <sup>‡</sup> 8	(19 <sup>+</sup> )	
3783.4+y <sup>@</sup> 11	(20 <sup>+</sup> )	
4204.5+y <sup>#</sup> 11	(21 <sup>+</sup> )	
4328.7+x <sup>‡</sup> 8	(21 <sup>+</sup> )	
4731.4+y <sup>@</sup> 11	(22 <sup>+</sup> )	
5171.7+y <sup>#</sup> 11	(23 <sup>+</sup> )	
5251.5+x <sup>‡</sup> 8	(23 <sup>+</sup> )	
5769.0+y <sup>@</sup> 11	(24 <sup>+</sup> )	
6226.4+y <sup>#</sup> 12	(25 <sup>+</sup> )	
6254.6+x <sup>‡</sup> 8	(25 <sup>+</sup> )	
6907.0+y <sup>@</sup> 15	(26 <sup>+</sup> )	
7337.7+x <sup>‡</sup> 9	(27 <sup>+</sup> )	

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$^{92}\text{Mo}(\alpha, \text{pn}\gamma)$     **2002Ha20,2001Pe17 (continued)** $^{126}\text{Pr}$  Levels (continued)

E(level)	$J^{\pi\ddagger}$	E(level)	$J^{\pi\ddagger}$	E(level)	$J^{\pi\ddagger}$	E(level)	$J^{\pi\ddagger}$
7373.2+y <sup>#</sup> 12	(27 <sup>+</sup> )	8613.2+y <sup>#</sup> 13	(29 <sup>+</sup> )	11051.5+x <sup>‡</sup> 12	(33 <sup>+</sup> )	13923.1+x <sup>‡</sup> 17	(37 <sup>+</sup> )
8153.0+y? <sup>@</sup> 14	(28 <sup>+</sup> )	9738.0+x <sup>‡</sup> 11	(31 <sup>+</sup> )	11284.2+y <sup>#</sup> 19	(33 <sup>+</sup> )	15500.1+x <sup>‡</sup> 20	(39 <sup>+</sup> )
8499.5+x <sup>‡</sup> 10	(29 <sup>+</sup> )	9933.2+y <sup>#</sup> 16	(31 <sup>+</sup> )	12444.1+x <sup>‡</sup> 13	(35 <sup>+</sup> )	17151.1+x? <sup>‡</sup> 16	(41 <sup>+</sup> )

<sup>†</sup> As proposed by [2002Ha20](#) based on the systematics of neighboring odd-odd Pr nuclides. [2001Pe17](#) suggested that the spins of band B and band C were higher by 2 than those of [2002Ha20](#), but this assignment would cause a severe discontinuity in the energy level systematics.

<sup>‡</sup> Band(A):  $\pi h_{11/2}\nu h_{9/2}$ ,  $\alpha=1$ . There is a possibility that this band belongs to another nuclide ([2002Ha20](#)).

<sup>#</sup> Band(B):  $\pi h_{11/2}\nu h_{11/2}$ ,  $\alpha=1$ .

<sup>@</sup> Band(C):  $\pi h_{11/2}\nu h_{11/2}$ ,  $\alpha=0$ .

 $\gamma(^{126}\text{Pr})$ 

$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	$E_i(\text{level})$	$J_i^{\pi}$	$E_f$	$J_f^{\pi}$	Mult.#	Comments
68.2 <sup>‡</sup>		68.2+y	(7 <sup>+</sup> )	0+y	(6 <sup>+</sup> )	D	$I_{\gamma}$ : Other: 50 5 ( <a href="#">2001Pe17</a> ). DCO=1.1 4 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 105 10 ( <a href="#">2001Pe17</a> ). DCO=0.6 1 ( <a href="#">2002Ha20</a> ). $I_{\gamma}$ : Other: 105 10 ( <a href="#">2001Pe17</a> ). DCO=0.41 7 ( <a href="#">2002Ha20</a> ), DCO=1.1 3 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 100 5 ( <a href="#">2001Pe17</a> ). DCO=0.51 5 ( <a href="#">2002Ha20</a> ), DCO=0.51 11 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 95 5 ( <a href="#">2001Pe17</a> ). DCO=0.55 7 ( <a href="#">2002Ha20</a> ), DCO=0.62 3 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 68.8 23 ( <a href="#">2001Pe17</a> ). DCO=0.42 5 ( <a href="#">2002Ha20</a> ), DCO=0.6 4 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 57.5 20 ( <a href="#">2001Pe17</a> ). DCO=0.48 7 ( <a href="#">2002Ha20</a> ), DCO=0.52 4 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 20 10 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 44.0 18 ( <a href="#">2001Pe17</a> ). DCO=0.41 6 ( <a href="#">2002Ha20</a> ), DCO=0.57 12 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 30.3 15 ( <a href="#">2001Pe17</a> ). DCO=0.47 8 ( <a href="#">2002Ha20</a> ), DCO=1.1 6 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 38 8 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 23.8 13 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 19.8 10 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 18.0 20 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 43 3 ( <a href="#">2001Pe17</a> ). DCO=1.0 1 ( <a href="#">2002Ha20</a> ). DCO=1.00 4 ( <a href="#">2002Ha20</a> ). $I_{\gamma}$ : Other: 16.3 10 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 12.0 10 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 9.5 10 ( <a href="#">2001Pe17</a> ). $I_{\gamma}$ : Other: 55.0 23 ( <a href="#">2001Pe17</a> ). DCO=1.0 1 ( <a href="#">2002Ha20</a> ). $I_{\gamma}$ : Other: 10.5 10 ( <a href="#">2001Pe17</a> ). DCO=1.20 5 ( <a href="#">2002Ha20</a> ). $I_{\gamma}$ : Other: 52.5 20 ( <a href="#">2001Pe17</a> ). DCO=0.9 1 ( <a href="#">2002Ha20</a> ), DCO=1.1 4 ( <a href="#">2001Pe17</a> ).
105.5 5		105.5+x	(5 <sup>+</sup> )	0+x			
105.5 5		173.6+y	(8 <sup>+</sup> )	68.2+y (7 <sup>+</sup> )		D,Q	
143.1 2	100	316.6+y	(9 <sup>+</sup> )	173.6+y (8 <sup>+</sup> )		D,Q	
167.4 2	99 8	484.0+y	(10 <sup>+</sup> )	316.6+y (9 <sup>+</sup> )		D,Q	
167.8 2	21 3	273.3+x	(7 <sup>+</sup> )	105.5+x (5 <sup>+</sup> )		Q	
210.6 2	82 7	694.5+y	(11 <sup>+</sup> )	484.0+y (10 <sup>+</sup> )		D,Q	
225.5 2	68 5	920.0+y	(12 <sup>+</sup> )	694.5+y (11 <sup>+</sup> )		D,Q	
248.4 2	26 3	316.6+y	(9 <sup>+</sup> )	68.2+y (7 <sup>+</sup> )			
273.8 2	44 4	1193.8+y	(13 <sup>+</sup> )	920.0+y (12 <sup>+</sup> )		D,Q	
279.9 2	47 4	553.2+x	(9 <sup>+</sup> )	273.3+x (7 <sup>+</sup> )		Q	
283.7 2	34 3	1477.7+y	(14 <sup>+</sup> )	1193.8+y (13 <sup>+</sup> )		D,Q	
310.4 2	28 3	484.0+y	(10 <sup>+</sup> )	173.6+y (8 <sup>+</sup> )			
327.4 2	30 3	1805.3+y	(15 <sup>+</sup> )	1477.7+y (14 <sup>+</sup> )			
343.5 2	26 2	2148.6+y	(16 <sup>+</sup> )	1805.3+y (15 <sup>+</sup> )			
369.1 2	25 2	2517.8+y	(17 <sup>+</sup> )	2148.6+y (16 <sup>+</sup> )			
377.8 2	41 4	694.5+y	(11 <sup>+</sup> )	316.6+y (9 <sup>+</sup> )		Q	
393.1 2	48 4	946.3+x	(11 <sup>+</sup> )	553.2+x (9 <sup>+</sup> )		Q	
399.1 2	10 1	3320.0+y	(19 <sup>+</sup> )	2921.0+y (18 <sup>+</sup> )			
403.4 2	13 1	2921.0+y	(18 <sup>+</sup> )	2517.8+y (17 <sup>+</sup> )			
422	7 1	4204.5+y	(21 <sup>+</sup> )	3783.4+y (20 <sup>+</sup> )			
435.9 2	60 5	920.0+y	(12 <sup>+</sup> )	484.0+y (10 <sup>+</sup> )		Q	
463	8 1	3783.4+y	(20 <sup>+</sup> )	3320.0+y (19 <sup>+</sup> )			
498.8 2	47 4	1445.1+x	(13 <sup>+</sup> )	946.3+x (11 <sup>+</sup> )		Q	
499.5 2	49 4	1193.8+y	(13 <sup>+</sup> )	694.5+y (11 <sup>+</sup> )		Q	

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**$^{92}\text{Mo}(^{40}\text{Ca},\alpha p n\gamma)$     2002Ha20,2001Pe17 (continued)**

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$\gamma(^{126}\text{Pr})$  (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>#</sup>	Comments
557.7 2	58 5	1477.7+y	(14 <sup>+</sup> )	920.0+y	(12 <sup>+</sup> )	Q	$I_\gamma$ : Other: 72.5 23 (2001Pe17). DCO=1.0 1 (2002Ha20).
594.5 2	40 3	2039.6+x	(15 <sup>+</sup> )	1445.1+x	(13 <sup>+</sup> )	Q	DCO=1.16 5 (2002Ha20).
611.6 2	56 5	1805.3+y	(15 <sup>+</sup> )	1193.8+y	(13 <sup>+</sup> )	Q	$I_\gamma$ : Other: 55 13 (2001Pe17). DCO=1.2 2 (2002Ha20).
670.9 2	53 5	2148.6+y	(16 <sup>+</sup> )	1477.7+y	(14 <sup>+</sup> )	Q	$I_\gamma$ : Other: 53 5 (2001Pe17). DCO=1.1 2 (2001Ha20).
681.9 2	39 3	2721.5+x	(17 <sup>+</sup> )	2039.6+x	(15 <sup>+</sup> )	Q	DCO=1.04 6 (2002Ha20).
712.4 2	52 5	2517.8+y	(17 <sup>+</sup> )	1805.3+y	(15 <sup>+</sup> )		$I_\gamma$ : Other: 48 3 (2001Pe17).
763.7 2	30 3	3485.2+x	(19 <sup>+</sup> )	2721.5+x	(17 <sup>+</sup> )	Q	DCO=1.21 6 (2002Ha20).
772.5 2	43 4	2921.0+y	(18 <sup>+</sup> )	2148.6+y	(16 <sup>+</sup> )		
802.0 2	44 4	3320.0+y	(19 <sup>+</sup> )	2517.8+y	(17 <sup>+</sup> )		$I_\gamma$ : Other: 48 3 (2001Pe17).
843.5 2	23 2	4328.7+x	(21 <sup>+</sup> )	3485.2+x	(19 <sup>+</sup> )	Q	DCO=1.02 6 (2002Ha20).
862.4 2	29 3	3783.4+y	(20 <sup>+</sup> )	2921.0+y	(18 <sup>+</sup> )		$I_\gamma$ : Other: 30.0 18 (2001Pe17).
884.5 2	29 3	4204.5+y	(21 <sup>+</sup> )	3320.0+y	(19 <sup>+</sup> )		$I_\gamma$ : Other: 37.5 23 (2001Pe17).
922.8 2	18 2	5251.5+x	(23 <sup>+</sup> )	4328.7+x	(21 <sup>+</sup> )	Q	DCO=0.99 7 (2002Ha20).
948.0 2	22 2	4731.4+y	(22 <sup>+</sup> )	3783.4+y	(20 <sup>+</sup> )		$I_\gamma$ : Other: 20.5 15 (2001Pe17).
967.2 2	21 2	5171.7+y	(23 <sup>+</sup> )	4204.5+y	(21 <sup>+</sup> )		$I_\gamma$ : Other: 25.0 18 (2001Pe17).
1003.1 2	15 2	6254.6+x	(25 <sup>+</sup> )	5251.5+x	(23 <sup>+</sup> )		
1037.6 2	13 1	5769.0+y	(24 <sup>+</sup> )	4731.4+y	(22 <sup>+</sup> )		$I_\gamma$ : Other: 19.3 20 (2001Pe17).
1054.7 2	16 2	6226.4+y	(25 <sup>+</sup> )	5171.7+y	(23 <sup>+</sup> )		$I_\gamma$ : Other: 23.8 20 (2001Pe17).
1083.1 2	10 1	7337.7+x	(27 <sup>+</sup> )	6254.6+x	(25 <sup>+</sup> )		
1138	7 1	6907.0+y	(26 <sup>+</sup> )	5769.0+y	(24 <sup>+</sup> )		$I_\gamma$ : Other: 9.3 15 (2001Pe17).
1146.8 2	10 1	7373.2+y	(27 <sup>+</sup> )	6226.4+y	(25 <sup>+</sup> )		$I_\gamma$ : Other: 12.0 15 for rather discrepant $E\gamma=1149$ (2001Pe17).
1161.8 5	6 1	8499.5+x	(29 <sup>+</sup> )	7337.7+x	(27 <sup>+</sup> )		
1238.5 5	<5	9738.0+x	(31 <sup>+</sup> )	8499.5+x	(29 <sup>+</sup> )		
1240.0 5	8 1	8613.2+y	(29 <sup>+</sup> )	7373.2+y	(27 <sup>+</sup> )		
1246 @	<5	8153.0+y?	(28 <sup>+</sup> )	6907.0+y	(26 <sup>+</sup> )		$I_\gamma$ : Other: 13.0 18 (2001Pe17).
1313.5 5	<5	11051.5+x	(33 <sup>+</sup> )	9738.0+x	(31 <sup>+</sup> )		$I_\gamma$ : Other: 6.5 15 (2001Pe17).
1320	<5	9933.2+y	(31 <sup>+</sup> )	8613.2+y	(29 <sup>+</sup> )		
1351	<5	11284.2+y	(33 <sup>+</sup> )	9933.2+y	(31 <sup>+</sup> )		
1392.5 5	<5	12444.1+x	(35 <sup>+</sup> )	11051.5+x	(33 <sup>+</sup> )		
1479	<5	13923.1+x	(37 <sup>+</sup> )	12444.1+x	(35 <sup>+</sup> )		
1577	<5	15500.1+x	(39 <sup>+</sup> )	13923.1+x	(37 <sup>+</sup> )		
1651 @	<5	17151.1+x?	(41 <sup>+</sup> )	15500.1+x	(39 <sup>+</sup> )		

<sup>†</sup> From 2002Ha20, unless otherwise noted.

<sup>‡</sup> From 2001Pe17.

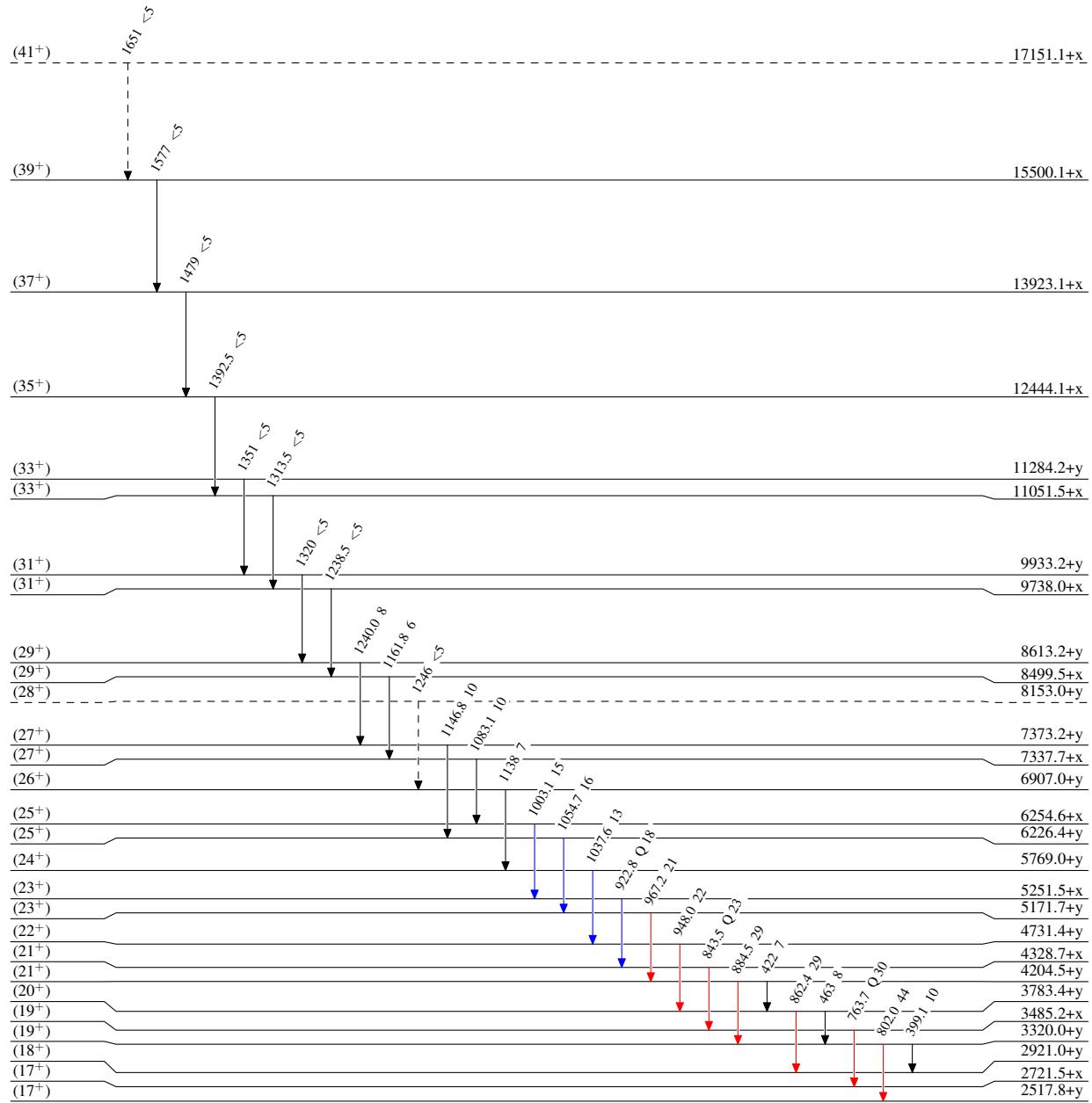
<sup>#</sup> From DCO. D corresponds to  $\Delta J=1$ , and Q to  $\Delta J=2$ .

@ Placement of transition in the level scheme is uncertain.

$^{92}\text{Mo}(^{40}\text{Ca},\alpha\text{pn}\gamma)$     **2002Ha20,2001Pe17**

## 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)



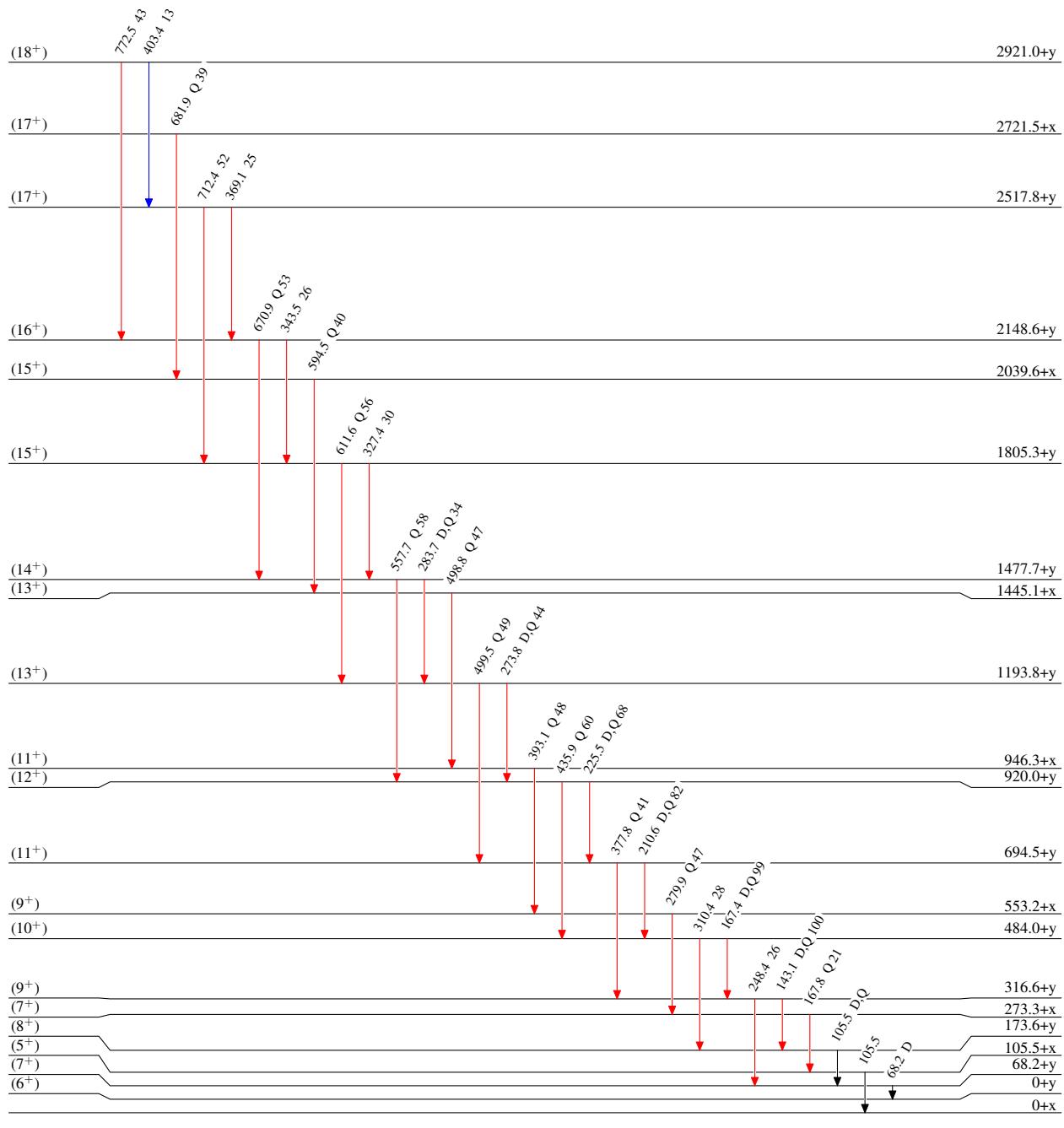
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## Level Scheme (continued)

Intensities: Relative  $I_\gamma$ 

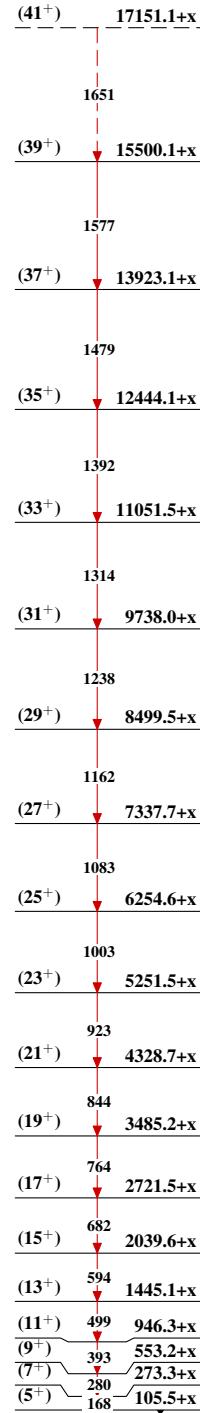
## Legend

- $\longrightarrow$   $I_\gamma < 2\% \times I_\gamma^{\max}$
- $\xrightarrow{\quad}$   $I_\gamma < 10\% \times I_\gamma^{\max}$
- $\xrightarrow{\quad}$   $I_\gamma > 10\% \times I_\gamma^{\max}$

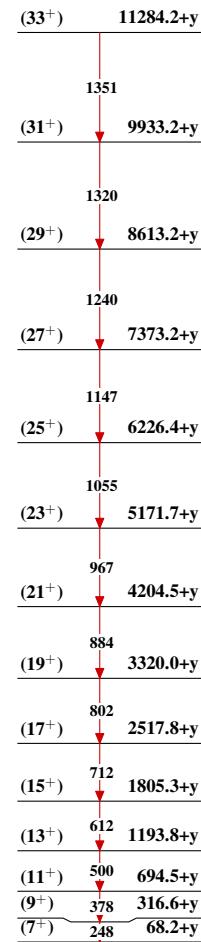


$^{92}\text{Mo}(\text{Ca},\alpha p n\gamma)$     2002Ha20,2001Pe17

Band(A):  $\pi h_{11/2} v h_{9/2}$ ,  
 $\alpha=1$



Band(B):  $\pi h_{11/2} v h_{11/2}$ ,  
 $\alpha=1$



Band(C):  $\pi h_{11/2} v h_{11/2}$ ,  
 $\alpha=0$

