^{78}Se(d,nγ) 1989DjZW

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 135, 193 (2016)	31-May-2016

1989DjZW: E=5-8 MeV. Measured γ, $\gamma\gamma$, $\gamma(\theta)$ and excitation functions.

^{79}Br Levels

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0.0	$3/2^-$		
207.5 *3*	$9/2^+$	4.85 s *4*	%IT=100 $T_{1/2}$: from Adopted Levels.
217.1 *2*	$5/2^-$		
261.2 *2*	$3/2^-$		
306.2 *3*	$1/2^-$,$3/2^-$		J$^\pi$: $1/2^-$ (1989DjZW).
381.2 *3*	$5/2^+$		
397.3 *3*	$1/2^-$,$3/2^-$		J$^\pi$: $3/2^-$ (1989DjZW).
523.1 *2*	$5/2^-$		
605.9 *2*	$3/2^-$		
761.4 *2*	$7/2^-$		
793.4 *2*	($3/2^-$,5/2)		J$^\pi$: $5/2^-$ (1989DjZW).
796.8 *4*	$13/2^+$		
831.3 *4*	$1/2^-$,$3/2^-$		
906.2 *3*	$(7/2)^-$		
939.7 *4*	(3/2)		
954.1 *3*	($7/2^-$)		
1032.1 *5*			J$^\pi$: 3/2 (1989DjZW).
1068.2 *4*	$9/2^-$		
1112.7 *5*	$1/2^-$,$3/2^-$		J$^\pi$: $1/2^-$ (1989DjZW).
1123.3 *4*	($3/2^-$,5/2)		J$^\pi$: $5/2^-$ (1989DjZW).
1132.0 *6*	1/2,3/2		J$^\pi$: $3/2^-$ (1989DjZW).
1176.2 *4*	($5/2^+$)		J$^\pi$: $3/2^+$ (1989DjZW).
1180.9 *4*	$11/2^+$		
1188.8 *6*			
1221.5 *6*	$5/2^-$,$7/2^-$		J$^\pi$: $7/2^+$ (1989DjZW).
1254.2 *4*			J$^\pi$: $3/2^-$ (1989DjZW).
1256.2 *4*	(7/2)		
1313.8 *3*	($3/2^-$,5/2,$7/2^-$)		J$^\pi$: $3/2^-$ (1989DjZW).
1333.0 *3*			E(level): there are probably two levels near this energy: 1332 level defined by 809.9γ, 1115.9γ and 1333 level defined by 571.6γ and possibly 809γ. J$^\pi$(1332)=$3/2^-$ and J$^\pi$(1333)=(5/2,7/2,9/2) (see Adopted Levels and gammas). 1989DjZW propose only one level with J$^\pi$=$3/2^-$.
1390.3 *5*	$(9/2)^+$		
1470.5 *5*			J$^\pi$: $3/2^+$ (1989DjZW).
1491.7 *7*			J$^\pi$: $9/2^+$ (1989DjZW).
1501.7 *6*	1/2,3/2		J$^\pi$: $3/2^-$ (1989DjZW).
1512.3 *7*			
1572.7 *6*	$(5/2)^+$		J$^\pi$: $3/2^+$ (1989DjZW).
1621.5 *6*			J$^\pi$: $11/2^+$ (1989DjZW).
1713.3 *5*	$11/2^-$		
1732.2 *11*			
1948.2 *5*			
1957.0 *11*	$15/2^+$		
2356.7 *15*			

† From least-squares fit to Eγ data assuming uncertainty of 0.3 keV for strong γ rays and 0.5 for weaker ones.

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^{78}Se(d,nγ) 1989DjZW (continued)

^{79}Br Levels (continued)

‡ From Adopted Levels. The assignments suggested by 1989DjZW on the basis of their $\gamma(\theta)$ and excitation function data are given under comments.

$\gamma(^{79}Br)$

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
173.7[@] *5*	6.2	381.2	$5/2^+$	207.5	$9/2^+$		A_2=+0.05 *3*
180.2[#@]		397.3	$1/2^-$,$3/2^-$	217.1	$5/2^-$		
207.5 *3*	100	207.5	$9/2^+$	0.0	$3/2^-$	E3	Mult.: from Adopted Gammas.
208.6[‡#]		605.9	$3/2^-$	397.3	$1/2^-$,$3/2^-$		
217.1 *3*	98	217.1	$5/2^-$	0.0	$3/2^-$		A_2=−0.06 *3*
236.5 *5*	1.3	1176.2	$(5/2^+)$	939.7	(3/2)		A_2=−0.03 *3*; A_4=+0.01 *3*
238.3 *5*	3.1	761.4	$7/2^-$	523.1	$5/2^-$		A_2=−0.09 *3*; A_4=+0.01 *4* δ(Q/D)=+0.14 *+26−19* from A_2 and A_4.
261.2[†] *3*	40	261.2	$3/2^-$	0.0	$3/2^-$		
270.0 *5*	9.9	1176.2	$(5/2^+)$	906.2	$(7/2)^-$		A_2=+0.03 *8*
299.7 *5*	2.4	605.9	$3/2^-$	306.2	$1/2^-$,$3/2^-$		A_2=−0.02 *5*
306.2[‡] *3*	24	306.2	$1/2^-$,$3/2^-$	0.0	$3/2^-$		
306.5[‡#]		1068.2	$9/2^-$	761.4	$7/2^-$		A_2=+0.12 *9*; A_4=−0.01 *9* E_γ: from level scheme drawing (1989DjZW). The authors give 306.8 in table.
344.5 *5*	1.7	605.9	$3/2^-$	261.2	$3/2^-$		A_2=−0.01 *3*; A_4=−0.01 *4* I_γ: seems too high by a factor of≈5 (see Adopted Gammas).
365.3[‡#]		1621.5		1256.2	(7/2)		
381.2 *3*	72	381.2	$5/2^+$	0.0	$3/2^-$		A_2=−0.05 *7*
384.1 *5*	1.0	1180.9	$11/2^+$	796.8	$13/2^+$		
388.8 *5*	2.3	605.9	$3/2^-$	217.1	$5/2^-$		A_2=−0.01 *3*; A_4=−0.01 *3*
397.3[†] *3*	12	397.3	$1/2^-$,$3/2^-$	0.0	$3/2^-$		
434.0[#]		831.3	$1/2^-$,$3/2^-$	397.3	$1/2^-$,$3/2^-$		
438.4 *5*	3.5	1470.5		1032.1			A_2=−0.09 *3*; A_4=−0.01 *4*
484.1 *5*	3.0	1390.3	$(9/2)^+$	906.2	$(7/2)^-$		A_2=−0.25 *3*; A_4=+0.01 *3* δ(Q/D)=+0.8 *+17−6* from A_2 and A_4.
487.2 *5*	2.0	793.4	$(3/2^-,5/2)$	306.2	$1/2^-$,$3/2^-$		A_2=+0.12 *4*; A_4=−0.01 *4*
506.8[†] *5*	3.0	1112.7	$1/2^-$,$3/2^-$	605.9	$3/2^-$		
523.1[‡] *3*	38	523.1	$5/2^-$	0.0	$3/2^-$		A_2=−0.02 *5*; A_4=−0.02 *6*
524.9[‡] *5*	4.9	906.2	$(7/2)^-$	381.2	$5/2^+$		A_2=−0.15 *5*
525.1[‡]	0.4	831.3	$1/2^-$,$3/2^-$	306.2	$1/2^-$,$3/2^-$		
532.2 *5*	3.9	793.4	$(3/2^-,5/2)$	261.2	$3/2^-$		A_2=−0.08 *3*
544.3 *3*	24	761.4	$7/2^-$	217.1	$5/2^-$		A_2=−0.01 *4*
552.4[†] *5*	3.7	1313.8	$(3/2^-,5/2,7/2^-)$	761.4	$7/2^-$		A_2=+0.01 *3*
558.5 *3*	14	939.7	(3/2)	381.2	$5/2^+$		A_2=−0.04 *5*; A_4=+0.01 *5*
571.6[‡] *5*	7.6	1333.0		761.4	$7/2^-$		This γ probably belongs to another level near 1333 (see Adopted Gammas).
572.6[‡] *5*	1.2	1512.3		939.7	(3/2)		
576.3 *5*	8.4	793.4	$(3/2^-,5/2)$	217.1	$5/2^-$		A_2=+0.08 *3*
589.3 *3*	28	796.8	$13/2^+$	207.5	$9/2^+$		A_2=+0.21 *4* E_γ: from level scheme drawing (1989DjZW). The authors give 589.9 in table.
605.9 *3*	11	605.9	$3/2^-$	0.0	$3/2^-$		A_2=−0.03 *3*; A_4=−0.01 *3*
614.2[‡#]		831.3	$1/2^-$,$3/2^-$	217.1	$5/2^-$		

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^{78}Se(d,nγ) 1989DjZW (continued)

$\gamma(^{79}Br)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Comments
624.5#		2356.7		1732.2		
645.1 *5*	2.2	1713.3	$11/2^-$	1068.2	$9/2^-$	A_2=−0.19 *3*; A_4=+0.06 *3* δ(Q/D)=+4.7 *+38−15* from A_2 and A_4.
650.9 *5*	5.4	1032.1		381.2	$5/2^+$	A_2=−0.04 *5* δ(Q/D)=−0.09 *+8−1* from A_2.
666.5 *5*	4.1	1572.7	$(5/2)^+$	906.2	$(7/2)^-$	A_2=−0.04 *2*
692.9 *3*	19	954.1	$(7/2^-)$	261.2	$3/2^-$	A_2=+0.04 *3*
694.9‡ *5*	7.0	1491.7		796.8	$13/2^+$	
698.7 *3*	29	906.2	$(7/2)^-$	207.5	$9/2^+$	A_2=−0.11 *3* δ(Q/D)=−2.4 *+2−49* from A_2.
715.3 *5*	3.5	1621.5		906.2	$(7/2)^-$	A_2=−0.01 *3*; A_4=+0.02 *4*
734.7 *5*	1.0	1132.0	1/2,3/2	397.3	$1/2^-$,$3/2^-$	A_2=−0.01 *3*; A_4=+0.01 *3*
737.0 *5*	7.9	954.1	$(7/2^-)$	217.1	$5/2^-$	A_2=−0.12 *3*
761.4‡ *3*	14	761.4	$7/2^-$	0.0	$3/2^-$	
790.7 *5*	7.2	1313.8	$(3/2^-,5/2,7/2^-)$	523.1	$5/2^-$	
793.4 *3*	11	793.4	$(3/2^-,5/2)$	0.0	$3/2^-$	A_2=−0.11 *2*; A_4=−0.01 *3*
795.0 *3*	11	1176.2	$(5/2^+)$	381.2	$5/2^+$	A_2=+0.02 *4*
809.9 *5*	3.2	1333.0		523.1	$5/2^-$	A_2=+0.01 *2*
831.3† *5*	8.3	831.3	$1/2^-$,$3/2^-$	0.0	$3/2^-$	
840.3 *5*	3.7	1221.5	$5/2^-$,$7/2^-$	381.2	$5/2^+$	A_2=+0.05 *2*; A_4=+0.01 *3*
851.1 *3*	17	1068.2	$9/2^-$	217.1	$5/2^-$	A_2=+0.16 *3*; A_4=−0.02 *4*
862.1 *5*	1.4	1123.3	$(3/2^-,5/2)$	261.2	$3/2^-$	A_2=−0.12 *3*
875.0 *3*	11	1256.2	(7/2)	381.2	$5/2^+$	A_2=−0.16 *4*
880.0‡ *3*	11	1948.2		1068.2	$9/2^-$	
935.4#		1732.2		796.8	$13/2^+$	
951.9‡ *5*	4.2	1713.3	$11/2^-$	761.4	$7/2^-$	
954.1‡ *5*	3.1	954.1	$(7/2^-)$	0.0	$3/2^-$	A_2=+0.05 *3*; A_4=−0.01 *3*
971.7‡ *5*	2.5	1188.8		217.1	$5/2^-$	
973.4‡ *3*	27	1180.9	$11/2^+$	207.5	$9/2^+$	
993.0 *5*	7.2	1254.2		261.2	$3/2^-$	A_2=+0.05 *2*; A_4=+0.01 *3*
1009.1 *5*	2.8	1390.3	$(9/2)^+$	381.2	$5/2^+$	A_2=+0.01 *3*; A_4=−0.04 *3*
1052.6#		1313.8	$(3/2^-,5/2,7/2^-)$	261.2	$3/2^-$	
1089.3 *5*	3.7	1470.5		381.2	$5/2^+$	A_2=−0.04 *2*; A_4=−0.01 *2*
1104.4 *5*	1.4	1501.7	1/2,3/2	397.3	$1/2^-$,$3/2^-$	A_2=+0.02 *2*
1112.7#		1112.7	$1/2^-$,$3/2^-$	0.0	$3/2^-$	
1115.9 *5*	2.6	1333.0		217.1	$5/2^-$	A_2=+0.01 *3*
1123.3 *5*	4.3	1123.3	$(3/2^-,5/2)$	0.0	$3/2^-$	A_2=−0.01 *3*; A_4=+0.01 *3*
1160.2#		1957.0	$15/2^+$	796.8	$13/2^+$	
1176.2		1176.2	$(5/2^+)$	0.0	$3/2^-$	γ shown in author's level scheme.
1254.2† *5*	2.0	1254.2		0.0	$3/2^-$	
1313.8† *5*	1.0	1313.8	$(3/2^-,5/2,7/2^-)$	0.0	$3/2^-$	
1333.0† *5*	0.9	1333.0		0.0	$3/2^-$	

† $\gamma(\theta)$ shows isotropic distribution.
‡ Unresolved multiplet.
# Weak γ ray; intensity not available.
@ Placement of transition in the level scheme is uncertain.

^{78}Se(d,nγ) 1989DjZW

Level Scheme

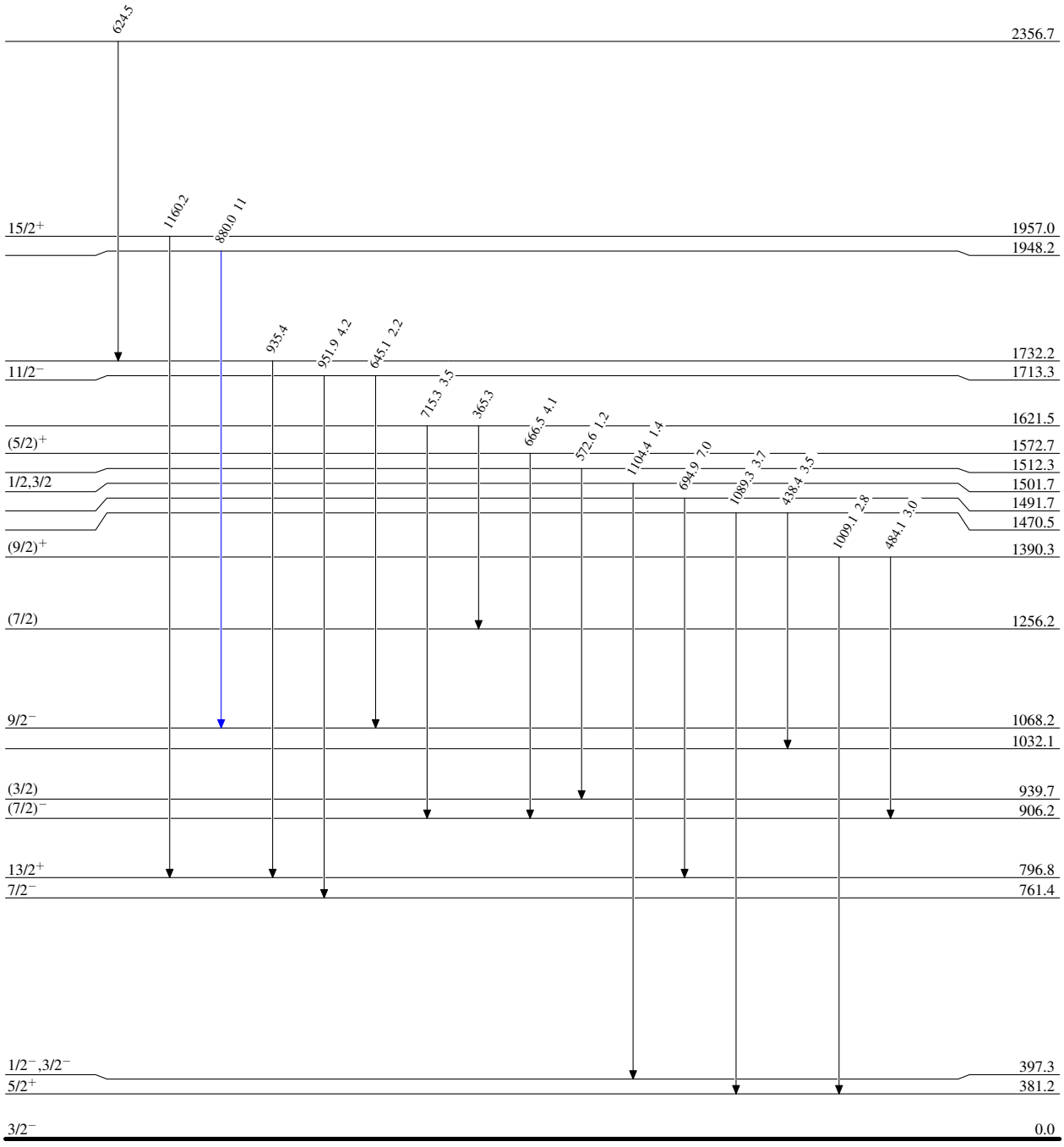
Intensities: Relative I_γ

Legend

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

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

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



$^{79}_{35}Br_{44}$

^{78}Se(d,nγ) 1989DjZW

Level Scheme (continued)

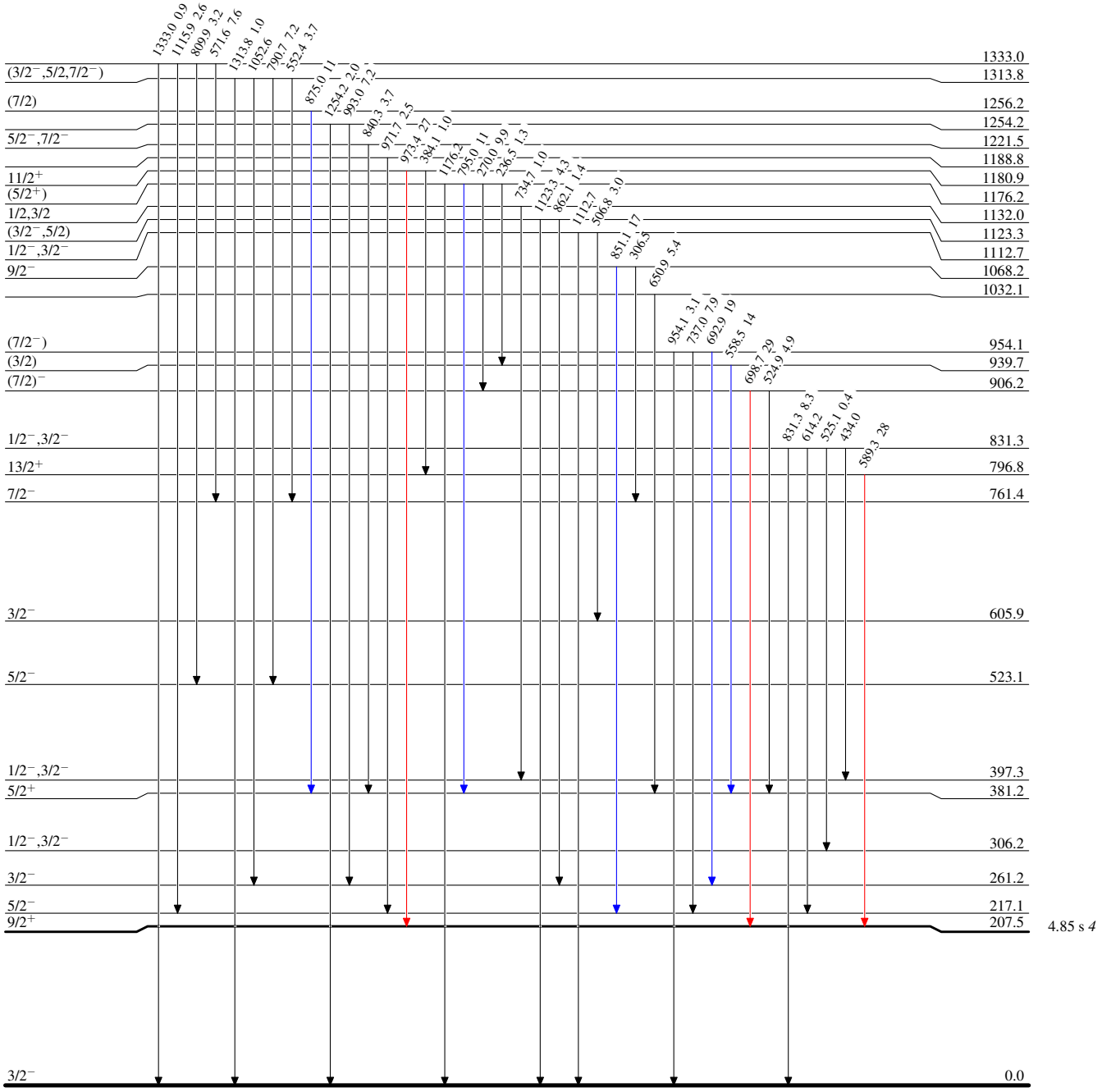
Intensities: Relative I_γ

Legend

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

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

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



$^{79}_{35}Br_{44}$

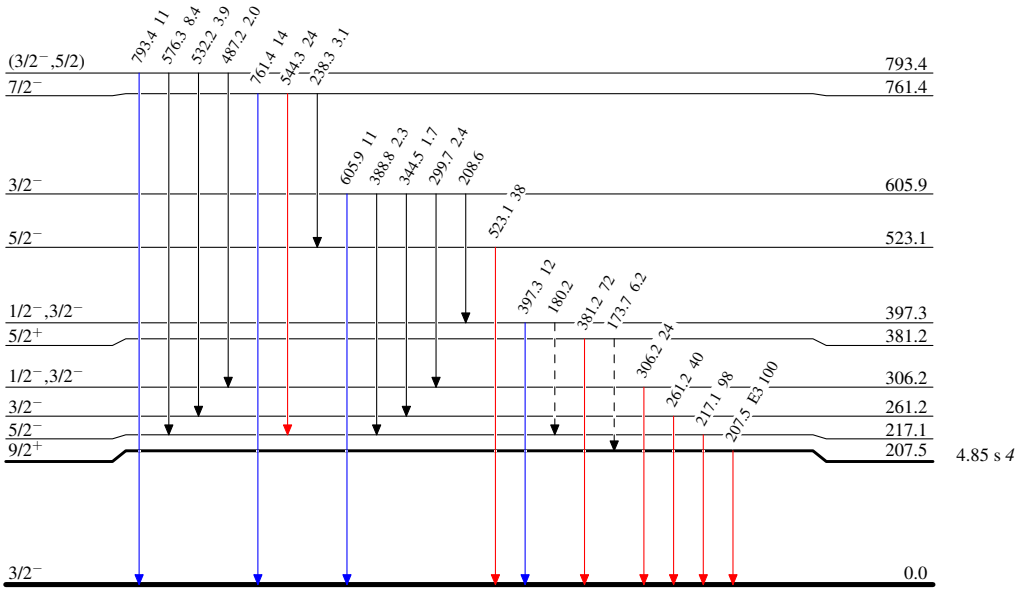
^{78}Se(d,nγ) 1989DjZW

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



$^{79}_{35}Br_{44}$