^{80}Se(d,nγ) 1989DjZW,1971Ch28,1971Br31

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 199,271 (2025)	1-Sep-2024

Other: 1971Br31.

1989DjZW: E=5-7 MeV, 99.45% ^{80}Se target; measured Eγ, Iγ, $\gamma\gamma$ coin, $\gamma(\theta)$ (all summarized in table 4), and excit. The level scheme is that of 1989DjZW (fig. 14), and it is based on extensive $\gamma\gamma$ coin data.

1971Ch28: E=10 MeV; measured d$\gamma(\theta$, H, t), dγ-delay. Deduced g, $T_{1/2}$. Stroboscopic method.

1971Br31: E=6.9 MeV; measured d$\gamma(\theta$, H, t). Deduced g; PAC technique.

^{81}Br Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0[@]	3/2$^-$[#]		
275.9[@]	5/2$^-$[#]		
536.1[&]	9/2$^+$[#]	32 μs *3*	g-factor=1.261 *10* (1971Ch28 – no Knight-shift corrections); g-factor=1.297 *15* (1971Br31). $T_{1/2}$: From 1971Ch28.
538.2	(1/2$^-$)		J$^\pi$: favored by γ excit and analogous to ^{79}Br(306 level).
566.1	(3/2$^-$)		
649.9	(3/2)$^-$[#]		
767.2	(5/2$^-$)		
789.4	5/2$^{(+)}$		
828.4	(3/2$^-$)		J$^\pi$: data for 552γ consistent with adopted J$^\pi$=3/2$^-$.
836.5[@]	(7/2$^-$)		J$^\pi$: data for 561γ consistent with adopted J$^\pi$=7/2$^-$.
1023.6	5/2$^{(-)}$		
1105.3	(1/2$^-$)		
1177.0[&]	(13/2$^+$)		
1238.7			
1266.4[@]	9/2$^{(-)}$		J$^\pi$: 430$\gamma(\theta)$ confirms J=9/2 from γ excit.
1323.1	(5/2$^-$)		
1371.5	(7/2$^+$)		
1481.8	(7/2$^-$)		
1513.0	(1/2$^-$,3/2$^-$)		J$^\pi$: quoted as (1/2$^-$) in text but (3/2$^-$) in table 4 and fig. 14.
1522.4	(11/2$^+$)		
1535.9	(3/2$^-$)		Excit supports 3/2$^-$ assignment.
1541.6	(9/2$^+$)		
1543.1	(3/2$^-$)		
1586.9	(1/2$^+$)		Omitted in fig. 14 of 1989DjZW.
1681.0	(7/2$^-$)		
1696.1	(3/2$^+$)		
1751.2			
1788.8	(7/2$^+$)		
1799.1	(5/2$^-$)		
1866.1	(3/2$^-$)		
1885.1			
1945.8[@]	(11/2$^-$)		
1948.3	(9/2$^+$)		
1995.8	7/2$^{(-)}$		
2000.5			E(level): misprinted as 2004.1 in table 4 and fig. 14 of 1989DjZW.
2022.1	(5/2$^+$)		
2118.0			
2221.2	(3/2$^+$,5/2$^+$)		J$^\pi$: 3/2 or 5/2 from 1432γ excit. Levels which deexcite to 789 level typically have π=(+).
2278.9[&]			J$^\pi$: γ to (13/2)$^+$.
2304.7	(7/2$^-$)		

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$^{80}Se(d,n\gamma)$ 1989DjZW,1971Ch28,1971Br31 (continued)

^{81}Br Levels (continued)

E(level)†	Jπ‡	Comments
2421.3		Jπ: γ to (13/2)+.
2549.5	(13/2−)	Assigned to g.s. band in 1989DjZW; assignment not adopted.

† From a least-squares fit to Eγ assuming equal weight for all Eγ data.
‡ Based on γ(θ) and γ excit from 1989DjZW, except as noted. Typically, it is unclear from the text whether J has been uniquely established by γ(θ) and, in those cases, the evaluator shows the J assignment as tentative.
# From Adopted Levels.
@ Member of g.s. quasirotational band (possible configuration: 3/2[301] or 3/2[312]).
& Member of possible π=+ quasirotational band.

γ(^{81}Br)

Eγ†	Iγ†	Ei(level)	Jπi	Ef	Jπf	Mult.#	δ#	Comments
260.2	36.5	536.1	9/2+	275.9	5/2−			
275.9	100.0	275.9	5/2−	0	3/2−	D		A_2=+0.01 2; A_4=−0.01 2
290.1	9.7	566.1	(3/2−)	275.9	5/2−	D		A_2=−0.03 3; A_4=+0.04 3
345.4		1522.4	(11/2+)	1177.0	(13/2+)			Weak line.
425.9	1.2	1948.3	(9/2+)	1522.4	(11/2+)	D		A_2=−0.03 2; A_4=+0.01 2
429.9	3.4	1266.4	9/2(−)	836.5	(7/2−)	D+Q	−0.19 +4−30	A_2=+0.05 9; A_4=+0.02 9
457.5	0.9	1023.6	5/2(−)	566.1	(3/2−)	D		A_2=−0.02 2
485.4	0.5	1023.6	5/2(−)	538.2	(1/2−)	Q		A_2=+0.18 2; A_4=+0.08 2
491.3‡	12.7‡	767.2	(5/2−)	275.9	5/2−			
513.5	3.4	789.4	5/2(+)	275.9	5/2−	D		γ(θ) isotropic.
538.2	5.1	538.2	(1/2−)	0	3/2−	D		γ(θ) isotropic.
539.2‡	0.6‡	1105.3	(1/2−)	566.1	(3/2−)			
552.4	2.1	828.4	(3/2−)	275.9	5/2−	D		A_2=−0.03 3; A_4=+0.05 3
560.6	15.3	836.5	(7/2−)	275.9	5/2−	D+Q	−0.19 +3−4	A_2=−0.02 4; A_4=+0.12 4
566.1	4.2	566.1	(3/2−)	0	3/2−	D		A_2=+0.05 3
582.1	2.5	1371.5	(7/2+)	789.4	5/2(+)	D(+Q)	+0.04 +8−4	A_2=−0.23 4; A_4=+0.06 4
640.8	7.6	1177.0	(13/2+)	536.1	9/2+	Q		A_2=+0.32 3; A_4=−0.17 4
649.9‡	6.4‡	649.9	(3/2)−	0	3/2−			
657.4	0.3	1681.0	(7/2−)	1023.6	5/2(−)	D(+Q)	−0.02 +8−9	A_2=−0.26 2
679.4	2.1	1945.8	(11/2−)	1266.4	9/2(−)	D(+Q)	−0.09 13	A_2=−0.04 2
706.6	0.4	1543.1	(3/2−)	836.5	(7/2−)			
714.6	0.8	1481.8	(7/2−)	767.2	(5/2−)	D(+Q)	−0.12 +81−10	A_2=−0.76 3; A_4=+0.01 3
729.4	0.7	1995.8	7/2(−)	1266.4	9/2(−)	D(+Q)	−0.1 5	A_2=−0.04 3
747.5	4.3	1023.6	5/2(−)	275.9	5/2−	D		A_2=+0.10 4; A_4=+0.51 4
752.2	0.7	1541.6	(9/2+)	789.4	5/2(+)	Q		A_2=+0.25 2; A_4=−0.12 2
767.2	8.1	767.2	(5/2−)	0	3/2−	D		A_2=+0.02 4; A_4=−0.01 4
789.4	9.3	789.4	5/2(+)	0	3/2−	D		A_2=−0.10 3; A_4=+0.08 3
797.5	1.3	1586.9	(1/2+)	789.4	5/2(+)			γ(θ) isotropic; placement implies a Q transition.
823.5‡	1.4‡	2000.5		1177.0	(13/2+)			
828.5‡	3.4‡	828.4	(3/2−)	0	3/2−			
829.4‡	1.3‡	1105.3	(1/2−)	275.9	5/2−			
831.9		1481.8	(7/2−)	649.9	(3/2)−			Forms doublet with ^{81}Se γ.
836.5‡	10.2‡	836.5	(7/2−)	0	3/2−			Forms doublet with ^{81}Se γ.
844.5	1.7	1681.0	(7/2−)	836.5	(7/2−)			A_2=+0.38 3 A_2 value implies ΔJ=0 transition.
906.7	1.7	1696.1	(3/2+)	789.4	5/2(+)	D		A_2=+0.05 2; A_4=−0.06 3

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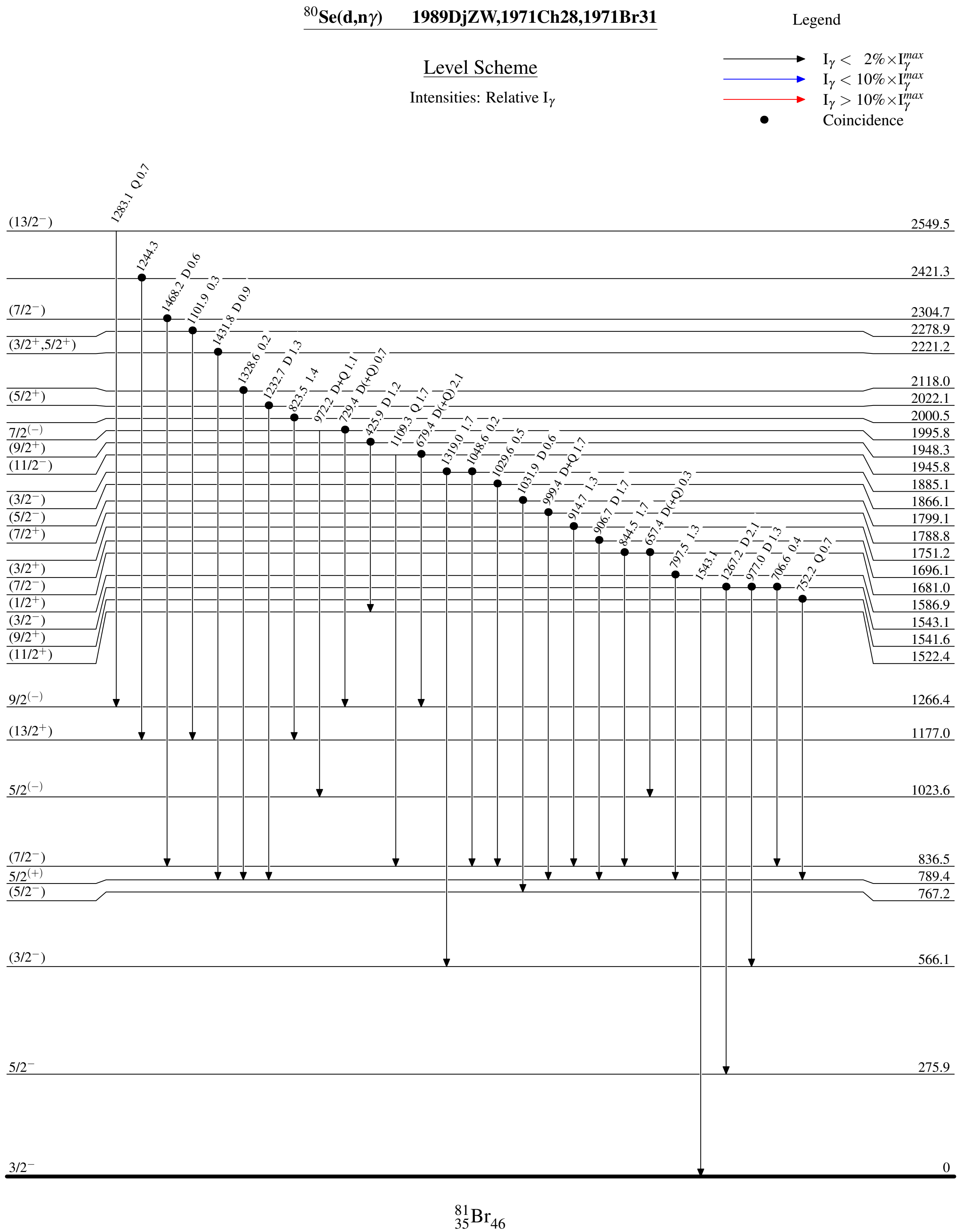
^{80}Se(d,nγ) 1989DjZW,1971Ch28,1971Br31 (continued)

γ(^{81}Br) (continued)

Eγ†	Iγ†	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ#	Comments
914.7	1.3	1751.2		836.5	$(7/2^-)$			Forms triplet with 915.7γ in ^{81}Br and 918γ in ^{81}Se. Divided Iγ given.
915.7	2.5	1481.8	$(7/2^-)$	566.1	$(3/2^-)$			Forms triplet with 914.7γ in ^{81}Br and 918γ in ^{81}Se. Divided Iγ given.
946.9	1.3	1513.0	$(1/2^-,3/2^-)$	566.1	$(3/2^-)$	D		A_2=−0.18 *2* A_2 value in table but described as isotropic in text.
962.7	0.5	1238.7		275.9	$5/2^-$			
972.2	1.1	1995.8	$7/2^{(-)}$	1023.6	$5/2^{(-)}$	D+Q	−0.65 *+12−24*	A_2=+0.10 *2*; A_4=+0.01 *2*
977.0	1.3	1543.1	$(3/2^-)$	566.1	$(3/2^-)$	D		A_2=+0.10 *2*
986.2	5.5	1522.4	$(11/2^+)$	536.1	$9/2^+$	D+Q	+0.09 *+21−2*	A_2=−0.40 *2*
990.5	4.7	1266.4	$9/2^{(-)}$	275.9	$5/2^-$	Q		A_2=+0.27 *2*; A_4=−0.08 *2*
997.7	0.5	1535.9	$(3/2^-)$	538.2	$(1/2^-)$	D		A_2=−0.18 *2*
999.4	1.7	1788.8	$(7/2^+)$	789.4	$5/2^{(+)}$	D+Q	−0.18 *+6−5*	A_2=−0.02 *2*; A_4=+0.10 *2*
1023.6	0.7	1023.6	$5/2^{(-)}$	0	$3/2^-$			
1029.6	0.5	1866.1	$(3/2^-)$	836.5	$(7/2^-)$			γ(θ) isotropic; placement implies Q transition.
1031.9	0.6	1799.1	$(5/2^-)$	767.2	$(5/2^-)$	D		A_2=+0.08 *2*
1047.2‡	3.6‡	1323.1	$(5/2^-)$	275.9	$5/2^-$			
1048.6‡	0.2‡	1885.1		836.5	$(7/2^-)$			
1101.9	0.3	2278.9		1177.0	$(13/2^+)$			
1105.3	1.7	1105.3	$(1/2^-)$	0	$3/2^-$	D		γ(θ) isotropic.
1109.3	1.7	1945.8	$(11/2^-)$	836.5	$(7/2^-)$	Q		A_2=+0.18 *2*; A_4=+0.02 *2*
1232.7	1.3	2022.1	$(5/2^+)$	789.4	$5/2^{(+)}$	D		A_2=+0.02 *2*
1244.3		2421.3		1177.0	$(13/2^+)$			Weak γ.
1267.2	2.1	1543.1	$(3/2^-)$	275.9	$5/2^-$	D		A_2=−0.27 *3*; A_4=+0.06 *3*
1283.1	0.7	2549.5	$(13/2^-)$	1266.4	$9/2^{(-)}$	Q		A_2=+0.24 *3*; A_4=+0.01 *3*
1319.0‡	1.7‡	1885.1		566.1	$(3/2^-)$			
1323.1	0.8	1323.1	$(5/2^-)$	0	$3/2^-$			Authors state that 1323γ(θ) is consistent with J=5/2 but give no A_2, A_4 data.
1328.6	0.2	2118.0		789.4	$5/2^{(+)}$			
1431.8	0.9	2221.2	$(3/2^+,5/2^+)$	789.4	$5/2^{(+)}$	D		A_2=+0.06 *3*; A_4=+0.01 *3*
1468.2	0.6	2304.7	$(7/2^-)$	836.5	$(7/2^-)$	D		A_2=+0.10 *3*; A_4=−0.01 *3*
1535.9	0.7	1535.9	$(3/2^-)$	0	$3/2^-$	D		γ(θ) isotropic. Eγ misprinted in fig. 14 of 1989DjZW.
1543.1		1543.1	$(3/2^-)$	0	$3/2^-$			Weak transition.

† Uncertainties not stated by authors (1989DjZW); however, Eγ values agree within 0.2 keV with those from Coulomb excitation and ^{81}Se β^- decay (18.5 min) whenever comparison is possible.
‡ Inadequately resolved from adjacent ^{81}Br γ and/or impurity γ for meaningful γ(θ) data to be obtained (1989DjZW). Eγ and Iγ values are for this component, however.
# From γ(θ) (1989DjZW) – A_2 and A_4 values are listed in comments.



80Se(d,nγ) 1989DjZW,1971Ch28,1971Br31
Level Scheme
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγmax
Iγ < 10%×Iγmax
Iγ > 10%×Iγmax
Coincidence
(13/2−) 2549.5
2421.3
(7/2−) 2304.7
2278.9
(3/2+,5/2+) 2221.2
2118.0
(5/2+) 2022.1
2000.5
7/2(−) 1995.8
(9/2+) 1948.3
(11/2−) 1945.8
1885.1
(3/2−) 1866.1
(5/2−) 1799.1
(7/2+) 1788.8
1751.2
(3/2+) 1696.1
(7/2−) 1681.0
(1/2+) 1586.9
(3/2−) 1543.1
(9/2+) 1541.6
(11/2+) 1522.4
9/2(−) 1266.4
(13/2+) 1177.0
5/2(−) 1023.6
(7/2−) 836.5
5/2(+) 789.4
(5/2−) 767.2
(3/2−) 566.1
5/2− 275.9
3/2− 0
1283.1 Q 0.7
1244.3
1468.2 D 0.6
1101.9 0.3
1431.8 D 0.9
1328.6 0.2
1232.7 D 1.3
823.5 1.4
972.2 D+Q 1.1
729.4 D(+Q) 0.7
425.9 D 1.2
1109.3 Q 1.7
679.4 D(+Q) 2.1
1319.0 1.7
1048.6 0.2
1029.6 0.5
1031.9 D 0.6
999.4 D+Q 1.7
914.7 1.3
906.7 D 1.7
844.5 1.7
657.4 D(+Q) 0.3
797.5 1.3
1543.1
1267.2 D 2.1
977.0 D 1.3
706.6 0.4
752.2 Q 0.7
81 35 Br 46

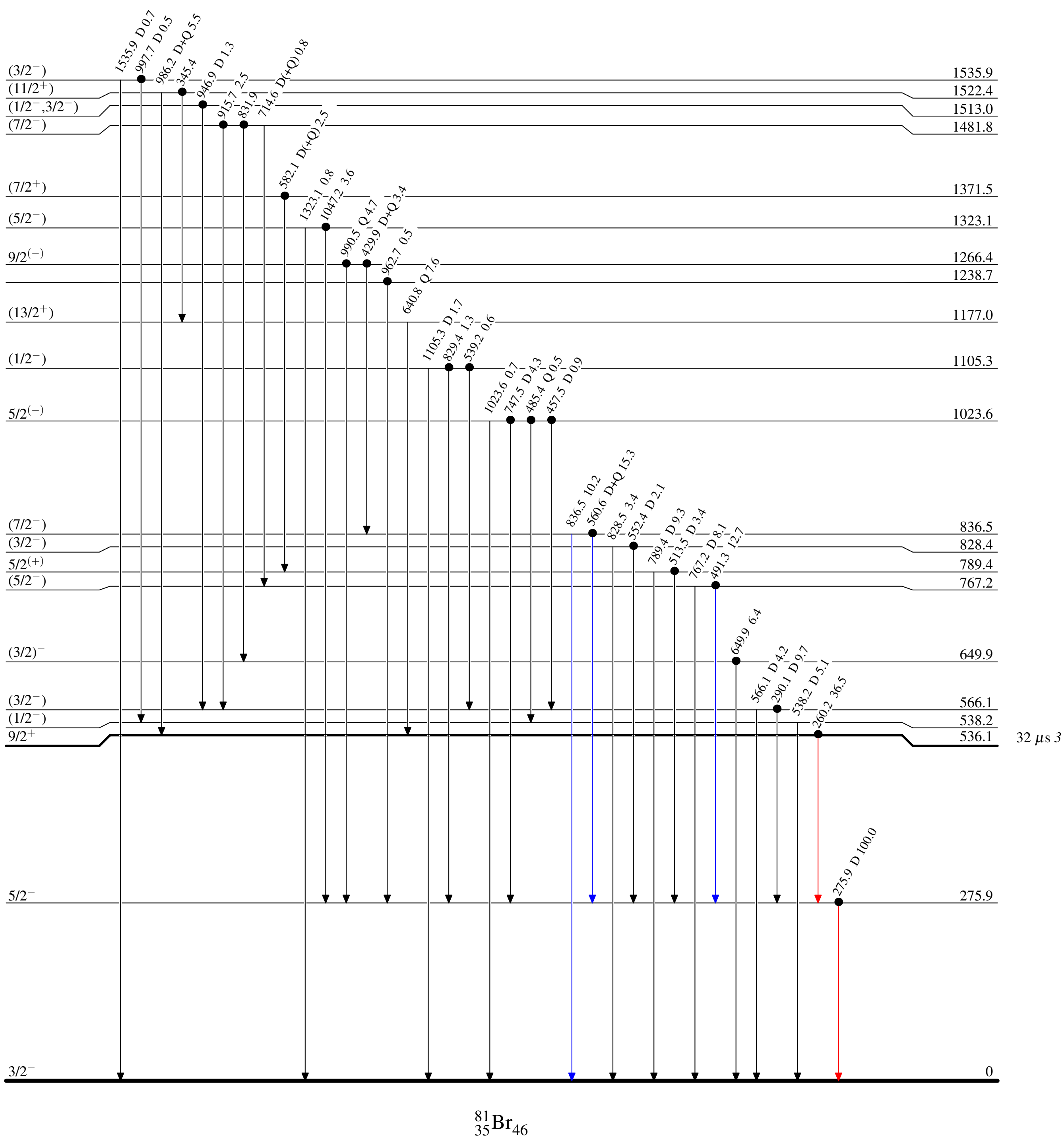
^{80}Se(d,nγ) 1989DjZW,1971Ch28,1971Br31

Level Scheme (continued)

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- ● Coincidence



$^{81}_{35}Br_{46}$