

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Ameenah R. Farhan, Balraj Singh		NDS 110, 1917 (2009)	30-Jun-2009

$Q(\beta^-) = -7244.4$; $S(n) = 12081.5$ 21; $S(p) = 8234.3$; $Q(\alpha) = -4391.3$ 7 [2012Wa38](#)

Note: Current evaluation has used the following Q record.

$S(2n) = 21308.4$; $S(2p) = 13505.6$ 7 ([2009AuZZ](#), [2003Au03](#)). Values In [2003Au03](#) are very nearly the same As In [2009AuZZ](#) except for small differences In uncertainties.

Measured mass excess = -74179.4 9 ([2006Ri15](#)).

$Q(\beta^-) = -7243.8$; $S(n) = 12081.4$ 21; $S(p) = 8234.3$; $Q(\alpha) = -4391.9$ 8 [2009AuZZ](#), [2003Au03](#)

Mass measurements: [2006Ri15](#) (LEBIT-NSCL Penning-trap method), [2006Ro11](#), [2005Sc26](#), [2002He23](#), [1978Di09](#).

Measurement of Hyperfine structure, isotope shift, etc.: [1995Ke04](#), [1992Sc19](#), [1990Ca26](#), [1990Sc30](#), [1989Tr04](#), [1981Ge06](#), [1979Ge06](#), [1977Ge05](#).

Additional information 1.

$^{78}\text{Se}(\pi^+, \pi^-)$: [1995Hu09](#).

Structure calculations (rotational bands, levels, deformation, transition probabilities, shape coexistence, etc.): [2007An01](#), [2006Be31](#), [2006Pe03](#), [2006Ve11](#), [2005Al19](#), [2003Sh17](#), [2000Gi16](#), [1996Tr01](#), [1995De02](#), [1991Jo03](#), [1991Le26](#), [1988Pr03](#), [1984Er02](#), [1984Se01](#), [1982So09](#), [1981Bu06](#), [1979Ka30](#).

 ^{78}Kr LevelsCross Reference (XREF) Flags

A	$^{78}\text{Br} \beta^-$ decay (6.46 min):?	E	$^{65}\text{Cu}(^{16}\text{O}, p2n\gamma), (^{19}\text{F}, \alpha2n\gamma)$	I	$^{78}\text{Kr}(p, p'), (p, p'\gamma)$
B	$^{78}\text{Rb} \varepsilon$ decay (17.66 min)	F	$^{68}\text{Zn}(^{12}\text{C}, 2n\gamma)$ E=33-38 MeV	J	Coulomb excitation
C	$^{78}\text{Rb} \varepsilon$ decay (5.74 min)	G	$^{68}\text{Zn}(^{12}\text{C}, 2n\gamma)$ E=36 MeV	K	$^{79}\text{Br}(p, 2n\gamma)$
D	$^{58}\text{Ni}(^{23}\text{Na}, 3p\gamma), (^{27}\text{Al}, \alpha3p\gamma)$	H	$^{76}\text{Se}(\alpha, 2n\gamma)$	L	$^{80}\text{Kr}(p, t)$

E(level) [†]	J ^π	T _{1/2} [‡]	XREF	Comments
0.0 ^a	0 ⁺	stable	ABCDEFGHIJK	XREF: A(?). $\langle r^2 \rangle^{1/2} = 4.2032$ fm 16 (2004An14 evaluation). $T_{1/2} \geq 1.5 \times 10^{21}$ y (2006Ga43 , 90% confidence limit) for double β decay ($2\varepsilon(K), 2\nu + 0\nu$ mode). Others: 2000Ga54 , 1998Ga27 , 1995Sa58 , 1994Sa31 . See also 2002Tr04 evaluation. Additional information 2. $\mu = +0.86$ 2 (2004Ku11) XREF: A(?). $\beta_2(p, p') = 0.351$ (DWBA analysis), 0.317 (coupled-channel). μ : transient magnetic field technique following Coulomb excitation (2004Ku11). Other: +0.86 6 (2001Me20). See also 2005St24 compilation. J^π : L(p, p')=2 and also from $\gamma(\theta)$ and $\gamma(\text{linear pol})$. $T_{1/2}$: weighted average of values from recoil-distance Doppler-shift method in in-beam γ -ray studies, DSA and B(E2) in Coul. ex. Values in ps are: 21.7 +7-8 (B(E2) In Coul. ex., 2006Be18), 22.2 14 (RDDS, 2002Jo07), 19.1 17 (DSAM In Coul. ex., 2001Me20), 21.1 9 (RDDS, 1990Ga22), 22.9 21 (RDDS, 1985Wi01 , 1982An06), >3.5 (DSA, 1980Ro02), 22.2 14 (RDDS, 1979He18), 25 3 (RDDS, 1974No08). J^π : E0 transition to 0 ⁺ (1995Gi13); L(p, t)=0. $T_{1/2}$: weighted average of 11.1 ps 6 (B(E2) in Coul. ex., 2006Be18) and 7.6 ps 21 (DSA in (p, p' γ), 1995Gi13). $\mu = +1.84$ 28 (2001Me20) μ : transient magnetic field technique following Coulomb excitation (2001Me20). See also 2005St24 compilation.
455.033 ^a 23	2 ⁺	21.6 ps 7	ABCDEFGHIJK	
1017.18 3	0 ⁺	10.8 ps 9	BCD IJ L	
1119.48 ^a 4	4 ⁺	2.52 ps 12	BCDEFGHIJK	

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Adopted Levels, Gammas (continued) ^{78}Kr Levels (continued)

E(level) [†]	J ^π #	T _{1/2} [‡]	XREF	Comments
				$\beta_2(\text{DWBA})=0.101$, $B(E4)(\text{W.u.})=5.5$ 11 in (p,p'). J^π : L(p,p')=4 and from $\gamma(\theta)$ and $\gamma(\text{linear pol})$. $T_{1/2}$: weighted average of values from recoil-distance Doppler-shift method in in-beam γ -ray studies, DSA and B(E2) in Coul. ex. Values in ps are: 2.42 +8–17 (B(E2) In Coul. ex., 2006Be18), 2.36 21 (RDDS, 2002Jo07), 2.09 18 (DSAM In Coul. ex., 2001Me20), 2.70 35 (DSA, 1993Bi04), 2.91 14 (RDDS, 1990Ga22), 2.56 35 (RDDS, 1985Wi01,1982An06), 6.2 28 (DSA, 1980Ro02), 2.50 21 (RDDS, 1979He18).
1147.901 @ 24	2 ⁺	3.3 ps 6	BCDEFGHIJK	$\mu=+1.08$ 20 (2001Me20) μ : transient magnetic field technique following Coulomb excitation (2001Me20). See also 2005St24 compilation. $\beta_2(\text{DWBA})=0.065$, $B(E2)(\text{W.u.})=1.8$ 4 from (p,p'). J^π : L(p,p')=2 and from $\gamma(\theta)$ and $\gamma(\text{linear pol})$. $T_{1/2}$: weighted average of 2.2 ps +5–4 (B(E2) in Coul. ex., 2006Be18), 3.1 ps 6 (RDDS, 1982An06) and 4.02 ps 35 (RDDS, 1979He18). Other: >0.6 ps (DSA, 1980Ro02).
1564.76 & 4	3 ⁺	4.73 ps 35	BCDEFGH K	J^π : $\gamma(\theta)$; $\gamma(\text{linear pol})$ of 735 γ from 5 ⁺ (2299) level. $T_{1/2}$: weighted average of 5.1 ps 4 (RDDS, 1982An06) and 4.44 ps 35 (RDDS, 1979He18). Other: >1.0 ps (DSA, 1980Ro02).
1653.9? 4			F	E(level): level is suspect, reported only in one study.
1755.86 3	2 ⁺	5.3 ps 4	BCD J	J^π : E2 γ 's to 0 ⁺ and 4 ⁺ . $T_{1/2}$: from B(E2) for 739 γ In Coul. ex. (2006Be18). Other: 0.074 ps 12 from B(E2) for 1756 γ In Coul. ex. (2006Be18) is discrepant.
1772.93 4	(1,2) ⁺		BC	J^π : M1,E2 γ to 2 ⁺ ; γ to 0 ⁺ .
1872.91 @ 4	4 ⁺	1.58 ps 17	CDEFGH JK	J^π : $\gamma(\theta)$ and $\gamma(\text{linear pol})$. $T_{1/2}$: weighted average of 1.72 ps +14–20 (B(E2) in Coul. ex., 2006Be18), 2.1 ps 7 (RDDS, 1982An06) and 1.32 ps 21 (RDDS, 1979He18). Other: >2.1 ps (DSA, 1980Ro02).
1977.91 ^a 7	6 ⁺	0.65 ps 7	BCDEFGH JK	XREF: B(?). J^π : $\gamma(\theta)$ and $\gamma(\text{linear pol})$. $T_{1/2}$: weighted average of values from Doppler-shift (DSA) method in in-beam γ -ray studies and B(E2) in Coul. ex. Values in ps are: 0.61 7 (B(E2) In Coul. ex., 2006Be18), 0.82 19 (DSA, 2006Dh01), 0.57 21 (DSA, 2002Jo07), 0.83 14 (DSA, 1993Bi04), 0.49 14 (DSA) and 0.69 14 (RDDS) (1985Wi01,1982An06), 1.25 28 (DSA, 1980Ro02), 0.62 10 (RDDS and DSA, 1979He18), <2 (RDDS, 1974No08).
2007.41 5	(0 to 3)		BC	XREF: C(?).
2234.19 4	(0 to 4) ⁺		BC	J^π : γ 's from (1 ⁺).
2240.69 5	(1,2) ⁺		BC	J^π : M1,E2 γ to 2 ⁺ .
2299.78 & 5	5 ⁺	0.57 ps 16	CDEFGH K	J^π : M1+E2 γ to 2 ⁺ ; γ 's to 0 ⁺ and 3 ⁺ . J^π : $\gamma(\theta)$ and $\gamma(\text{linear pol})$. $T_{1/2}$: weighted average of 0.44 ps 9 (DSA, 2002Jo07), 1.10 ps 28 (RDDS, 1982An06), 1.0 +10–3 (DSA, 1980Ro02) and 1.25 ps 28 (RDDS, 1979He18).
2399.03 ^f 5	3 ⁻	0.62 ps 14	BCDEFGHI L	$B(E3)\uparrow=0.042$ 14 (1978Ma11,2002Ki06) XREF: I(2384)L(2380). J^π : L(p,p')=3. L(p,t)=3. $T_{1/2}$: from DSA (1985Wi01,1982An06).
2413.41 11	2 ⁺ ,3 ⁺ ,4 ⁺		CD	J^π : M1,E2 γ to 2 ⁺ and 3 ⁺ ; possible β feeding from 4 ⁽⁻⁾ .
2443.37 5	(1,2) ⁺		BC J	XREF: J(?).
2472.0 5	(2,3)		F	J^π : M1+E2 γ to 2 ⁺ ; γ to 0 ⁺ .
2508.02 9			BC	J^π : $\Delta J=0,1$ γ to 2 ⁺ .
2573.36 7	1 ⁻ ,2 ⁻ ,3 ⁻		BCD	J^π : E1 γ to 2 ⁺ . Small ε feedings from 4 ⁽⁻⁾ and 0 ⁽⁺⁾ giving

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Adopted Levels, Gammas (continued) ^{78}Kr Levels (continued)

E(level) [†]	J ^π #	T _{1/2} [‡]	XREF	Comments
2656.12 5	(0,1)		B	inconsistent assignments are probably not reliable.
2677.63 9	3 ⁻		CD	J ^π : log ft=7.7 from 0 ⁽⁺⁾ ; γ to 2 ⁺ .
2731.7 [@] 4	(6 ⁺)	1.5 ps 7	DEFGH J	J ^π : E1 γ to 2 ⁺ ; log ft=6.9 from 4 ⁽⁻⁾ .
				XREF: J(?).
				J ^π : band assignment; γ's to 4 ⁺ and 6 ⁺ .
				T _{1/2} : weighted average of 1.4 ps 7 (RDDS,1982An06), 1.7 ps 9 (DSA,1980Ro02) and 1.4 ps 7 (DSA,1979He18).
2749.75 ^f 7	5 ⁻	1.36 ps 21	CDEFGH	J ^π : γ(θ) and γ(linear pol).
				T _{1/2} : weighted average of 0.76 ps +62-28 (DSA,1985Wi01,1982An06), 0.9 +14-5 (DSA,1980Ro02) and 1.52 ps 21 (RDDS,1979He18).
2764.10 ^e 5	(4) ⁻	1.9 ps 5	CDEFGH	J ^π : E1 γ's to 3 ⁺ and 4 ⁺ ; log ft=6.2 from 4 ⁽⁻⁾ .
				T _{1/2} : from <2.08 ps 35 (effective half-life,RDDS,1985Wi01,1982An06) and >1.4 ps (DSA,1985Wi01).
2882.07 9	3 ⁻		BC I L	XREF: I(2871)L(2874).
				B(E3)(W.u.)=6.2 9 from (p,p').
				J ^π : L(p,p')=3 and L(p,t)=3.
2882.84 7	(1)		B	J ^π : log ft=7.7 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
2890.66 ^d 11	(4) ⁻		D	J ^π : γ's to 3 ⁺ and 4 ⁺ .
2901.82 24	(4,5,6 ⁺)		D	J ^π : γ to 4 ⁺ .
2968.48 19			D	
2992.55 7			BC	J ^π : γ to 2 ⁺ .
2993.52 ^a 12	8 ⁺	0.31 ps 3	DEFGH J	J ^π : γ(θ) and γ(pol).
				T _{1/2} : weighted average of values from Doppler-shift (DSA) method in in-beam γ-ray studies and B(E2) in Coul. ex. Values in ps are: 0.28 3 (B(E2) In Coul. ex.,2006Be18), 0.28 7 (DSA,2006Dh01), 0.44 9 (DSA,2002Jo07), 0.37 5 (DSA,1993Bi04), 0.25 4 (DSA,1985Wi01), 0.30 +10-7, 0.26 6, 0.22 4 (DSA,1982An06), 0.49 14 (DSA,1980Ro02), 0.31 4 (DSA,1979He18).
2999.37 8	3 ⁻		CD	J ^π : E1 γ to 4 ⁺ ; γ to 2 ⁺ .
3036.5 5			D	
3064.71 ^b 10	(5) ⁻	1.0 ps +8-4	BCD GH	XREF: B(?).
				J ^π : E1 γ to 6 ⁺ ; γ to 5 ⁺ ; ΔJ=(0) γ to 5 ⁻ .
				T _{1/2} : from DSA (1982An06).
3072.40 ^c 7	(5) ⁻		CD	J ^π : log ft=6.8 from 4 ⁽⁻⁾ ; γ to 4 ⁺ .
3105.36 6	3 ⁻ ,4 ⁻ ,5 ⁻		C	J ^π : E1 γ to 4 ⁺ ; log ft=6.6 from 4 ⁽⁻⁾ .
3137.4 3			D	
3161.18 6	3 ⁻		CD	J ^π : E1 γ's to 2 ⁺ and 4 ⁺ .
3202.7 ^{&} 3	(7) ⁺	0.50 ps 14	DEFGH	J ^π : ΔJ=2, E2 γ to 5 ⁺ ; band assignment.
				T _{1/2} : weighted average of 0.62 ps 21, 0.38 ps 14, 0.49 ps 14 (DSA,1982An06), 0.69 ps 28 (DSA,1980Ro02) and 0.62 ps +42-21 (DSA,1979He18).
3219.88 ^e 22	(6) ⁻	5.0 ps 14	DEFGH	J ^π : γ(θ); γ's to 5 ⁺ and 6 ⁺ ; band assignment.
				T _{1/2} : weighted average of 4.9 ps 14 (RDDS,1985Wi01) and 5.1 ps +21-14 (RDDS,1982An06).
3230.48 5	(1)		B	J ^π : log ft=7.2 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
3233.55 6	3 ⁻ ,4 ⁻		C	J ^π : E1 γ's to 3 ⁺ and 4 ⁺ .
3288.36 ^f 10	7 ⁻	1.95 ps 21	DEFGH	J ^π : γ(θ), γ(linear pol); band assignment.
				T _{1/2} : weighted average of 1.94 ps 21 (RDDS,1985Wi01,1982An06), 1.3 ps 8 (DSA,1980Ro02) and 2.01 ps 21 (RDDS,1979He18).
3337.86 25			D	
3340.64 ^d 24	(6) ⁻		D	J ^π : ΔJ=1 γ to (5) ⁻ ; γ to and (4) ⁻ .
3361.12 11	4 ⁻ ,5 ⁻ ,6 ⁻		C	J ^π : M1 γ to 5 ⁻ ; 6 ⁻ is less likely from log ft=6.9 from 4 ⁽⁻⁾ .
3437.42 5	(1)		B	J ^π : log ft=6.1 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
3440.4 4			D	

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Adopted Levels, Gammas (continued) ^{78}Kr Levels (continued)

E(level) [†]	J ^π [#]	T _{1/2} [‡]	XREF	Comments
3539.07 4	(1)		B	J ^π : log ft=6.4 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
3548.1 4			D	
3575.08 6	(1)		B	J ^π : log ft=6.8 from 0 ⁽⁺⁾ ; γ to 0 ⁺ .
3607.6 4	7 ⁻	1.7 ps 5	D FGH	J ^π : γ(θ) and γ(linear pol). T _{1/2} : weighted average of 1.9 ps 5 (DSA,line shape), 2.6 ps +10-8 (RDDS)(1982An06) and 1.0 ps +14-4 (DSA,1980Ro02).
3662.17 5	(1)		B	J ^π : log ft=6.5 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
3669.22 6	3 ⁻ ,4 ⁻		C	J ^π : M1 γ to 3 ⁻ ; log ft=6.2 from 4 ⁽⁻⁾ .
3703.9 ^c 3	(7 ⁻)		D FGH	J ^π : ΔJ=1 γ to 6 ⁺ ; γ to (5 ⁻).
3725.48 6	3 ⁺ ,4 ⁺		CD	J ^π : E1 γ to 3 ⁻ ; log ft=6.2 from 4 ⁽⁻⁾ .
3749.14 9	(3,4,5 ⁻)		BCD	J ^π : log ft=6.9 from 4 ⁽⁻⁾ ; γ to 3 ⁻ .
3770.9 [@] 5	(8 ⁺)	0.186 ps 30	DEFGH	J ^π : ΔJ=2, E2 γ to 6 ⁺ ; band assignment. T _{1/2} : weighted average of 0.16 ps 4 (DSA,line shape), 0.208 ps 35 (DSA), 0.187 ps 35 (DSA) (1982An06) and 0.24 ps 7 (DSA,1980Ro02).
3771.32 ^b 25	(7 ⁻)	0.62 ps +49-21	D FGH	J ^π : γ's to 6 ⁺ and (5 ⁻). T _{1/2} : from DSA (1982An06).
3774.59 5	(3 ⁻)		CD	J ^π : M1+E2 γ to 3 ⁻ ; γ's to 2 ⁺ and 4 ⁺ .
3791.7 5		>0.7 ps	D GH	T _{1/2} : from DSA (1982An06).
3829.45 6	(1)		B	J ^π : log ft=6.5 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
3893.27 5	(1)		B	J ^π : log ft=5.7 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
3918.4 ^e 3	(8 ⁻)	0.95 ps 21	DEFGH	J ^π : γ(θ) and γ(linear pol). T _{1/2} : weighted average of 0.83 ps 35 (RDDS,1985Wi01,1982An06), 1.39 ps 35 (DSA,1980Ro02) and 0.83 ps 21 (RDDS,1979He18).
3919.7 6			D	
3922.8 4			D	
3937.57 4	(1)		B	J ^π : log ft=6.4 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
4007.80 5	(1)		BC	XREF: C(?). J ^π : log ft=6.5 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
4028.75 ^f 14	(9 ⁻)	0.81 ps 7	DEFGH	J ^π : γ(θ), γ(linear pol). T _{1/2} : weighted average of 0.94 ps 14 (DSA,2006Dh01), 0.97 ps 28 (DSA) and 1.2 ps 5 (RDDS)(1985Wi01,1982An06), 1.5 ps 6 (DSA,1980Ro02) and 0.76 ps 7 (RDDS,1979He18).
4040.39 5	(1)		B	J ^π : log ft=6.3 from 0 ⁽⁺⁾ ; γ to 0 ⁺ .
4089.32 5	(1)		B	J ^π : log ft=6.3 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
4106.0 ^a 3	10 ⁺	0.21 ps 3	DEFGH J	J ^π : ΔJ=2, E2 γ to 8 ⁺ . T _{1/2} : weighted average of values from Doppler-shift (DSA) method in in-beam γ-ray studies and B(E2) in Coul. ex. Values in ps are: 0.24 +2-3 (B(E2) In Coul. ex.,2006Be18), 0.152 35 (DSA,2006Dh01), 0.20 4 (DSA,2002Jo07, also 0.19 8 and <0.35 listed), 0.42 14 (DSA,1993Bi04,effective value), 0.21 4 (DSA,1985Wi01, 1982An06), 0.208 35 (DSA,line shape) and 0.097 28 (DSA) (1982An06), 0.33 7 (DSA,1980Ro02).
4201.68 8	(1)		B	J ^π : log ft=6.9 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
4213.3 ^d 4	(8 ⁻)		D	J ^π : ΔJ=(2) γ to (6 ⁻); γ to (7 ⁻).
4253.7 ^{&} 5	(9 ⁺)	0.19 ps 6	DEFGH	J ^π : ΔJ=(2), (E2) γ to 7 ⁺ . T _{1/2} : unweighted average of 0.083 ps 28 (DSA,line shape), 0.125 ps 35 (DSA), 0.21 ps 8 (DSA) (1982An06), 0.35 ps 7 (DSAM,1980Ro02).
4396.5 4	(10 ⁺)	0.146 ps 28	D GH	J ^π : ΔJ=(0), (M1) γ to 10 ⁺ ; γ to 8 ⁺ . T _{1/2} : from DSA (1985Wi01,1982An06). Other: 0.10 ps 4, 0.08 ps +5-4(DSA) (1982An06).
4420.86 9	(1)		B	J ^π : log ft=6.6 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
4673.1 ^c 5	(9 ⁻)		D	J ^π : ΔJ=2 γ to (7 ⁻); ΔJ=1 γ to 8 ⁺ .

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Adopted Levels, Gammas (continued) **^{78}Kr Levels (continued)**

E(level) [†]	J ^π #	T _{1/2} [‡]	XREF	Comments
4732.0 ^b 7	(9 ⁻)		D	J ^π : γ to (7 ⁻).
4808.5 ^e 3	(10 ⁺)	<1.6 ps	DEFGH	J ^π : ΔJ=2, E2 γ to 8 ⁻ . T _{1/2} : weighted average of 1.25 35 (DSA,1985Wi01,1982An06) and 1.11 ps 35 (RDDS,1985Wi01,1982An06) is 1.18 ps 35. As stated by 1985Wi01 this value is effective half-life, thus given as an upper limit here. Other: ≤1.0 ps (RDDS,1979He18).
4858.7?@ 5	(10 ⁺)		DE	J ^π : possible γ to (8 ⁺); possible band member.
4955.4 7	(10 ⁺)	0.45 ps 17	GH	J ^π : γ to (8 ⁺). T _{1/2} : from DSA (line-shape) (1982An06). Other: 0.24 ps 9 and 0.12 ps 6 from DSA (1982An06).
4965.86 ^f 24	(11 ⁻)	0.34 ps 6	DEFGH	J ^π : ΔJ=2, E2 γ to 9 ⁻ . T _{1/2} : from DSA. Weighted average of 0.24 ps 6 (2006Dh01), 0.38 ps 7 (1985Wi01,1982An06), 0.49 ps +35-21 and 0.44 ps +23-15 (1982An06), 0.49 ps 7 (1980Ro02), 0.25 8 (1979He18).
5011.52 7	(1)		B	J ^π : log ft=6.1 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
5061.68 17	(1)		B	J ^π : log ft=6.2 from 0 ⁽⁺⁾ and γ to 2 ⁺ .
5180.74 8	(1)		B	J ^π : log ft=5.8 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
5192.50 11	(1)		B	J ^π : log ft=5.7 from 0 ⁽⁺⁾ and γ's to 0 ⁺ , 2 ⁺ .
5217.1 ^d 7	(10 ⁻)		D	J ^π : ΔJ=(2) γ to (8 ⁻).
5217.8 ^a 5	12 ⁺	0.18 ps 3	DEFGH J	XREF: J(?). J ^π : ΔJ=2, E2 γ to 10 ⁺ . T _{1/2} : from DSA. Weighted average of 0.15 ps 4 (2006Dh01), 0.18 ps 3 and 0.21 ps 4 (2002Jo07), 0.17 ps 10 (1985Wi01).
5222.58 11	(1)		B	J ^π : log ft=6.1 from 0 ⁽⁺⁾ ; γ to 2 ⁺ .
5244.01 8	(1)		B	J ^π : log ft=5.9 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
5333.04 12	(1)		B	J ^π : log ft=5.9 from 0 ⁽⁺⁾ ; γ's 0 ⁺ and 2 ⁺ .
5369.56 15	(1)		B	J ^π : log ft=6.1 from 0 ⁽⁺⁾ .
5441.7 11	(11 ⁺)	0.21 ps 8	D GH	J ^π : γ to (9 ⁺). T _{1/2} : from DSA (1982An06). Weighted average of 0.24 ps 10, 0.21 ps 8 and 0.18 ps 9.
5529.19 11	(1)		B	J ^π : log ft=5.5 from 0 ⁽⁺⁾ ; γ to 0 ⁺ .
5543.68 16	(1)		B	J ^π : log ft=6.1 from 0 ⁽⁺⁾ .
5567.79 16	(1)		B	J ^π : log ft=5.8 from 0 ⁽⁺⁾ ; γ's to 0 ⁺ and 2 ⁺ .
5586.08 16	(1)		B	J ^π : log ft=6.1 from 0 ⁽⁺⁾ .
5776.3 ^c 9	(11 ⁻)		D	J ^π : γ to (9 ⁻).
5838.0 ^b 12	(11 ⁻)		D	J ^π : γ to (9 ⁻).
5855.0 ^e 6	(12 ⁻)		D	J ^π : ΔJ=2 γ to (10 ⁻).
6087.2 ^f 8	(13 ⁻)	0.14 ps 3	DE	J ^π : ΔJ=2, E2 γ to (11 ⁻). T _{1/2} : from DSA. Weighted average of 0.132 ps 28 (2006Dh01), 0.22 ps 10 (1979He18).
6305.1 ^d 12	(12 ⁻)		DE	J ^π : γ to (10 ⁻).
6480.3 ^a 6	14 ⁺	0.092 ps 21	DE GH	J ^π : ΔJ=2, E2 γ to 12 ⁺ . T _{1/2} : from DSA. Weighted average of 0.118 ps 35 (2006Dh01), 0.09 ps 4 and 0.076 ps 21 (2002Jo07), 0.15 ps 6 (1979He18).
6832.7? 13	(13 ⁺)		D	J ^π : possible γ to (11 ⁺); possible yrast state.
6853.3 ^c 13	(13 ⁻)		D	J ^π : γ to (11 ⁻).
7066.8 ^e 9	(14 ⁻)		D	J ^π : γ to (12 ⁻).
7392.5 ^f 11	(15 ⁻)	0.083 ps 28	D	J ^π : γ to (13 ⁻). T _{1/2} : from DSA (2006Dh01).
7457.1? ^d 13	(14 ⁻)		D	J ^π : γ to (12 ⁻).
7938.0 ^a 10	16 ⁺	0.152 ps 35	DE	J ^π : ΔJ=(2), (E2) γ to 14 ⁺ . T _{1/2} : from DSA. Weighted average of 0.20 ps 5 (2006Dh01), 0.10 ps 6 and 0.146 ps 35 (2002Jo07). Other: ≤0.14 ps (1979He18).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{78}Kr Levels (continued)

E(level) [†]	J ^π [#]	T _{1/2} [‡]	XREF	Comments
8469.2 ^e 12	(16 ⁻)		D	J ^π : γ to (14 ⁻).
8882.4 ^f 14	(17 ⁻)		D	J ^π : γ to (15 ⁻).
9570.0 ^a 14	18 ⁺	0.061 ps 23	D	J ^π : γ to 16 ⁺ . T _{1/2} : from DSA. Weighted average of 0.055 ps 21 (2006Dh01) and 0.15 ps 8 (2002Jo07).
10061.2 ^e 16	(18 ⁻)		D	J ^π : γ to (16 ⁻).
10551.4 ^f 17	(19 ⁻)		D	J ^π : γ to (17 ⁻).
11314.0 ^a 18	20 ⁺	0.072 ps 35	D	J ^π : γ to 18 ⁺ . T _{1/2} : from DSA. Weighted average of 0.062 ps 35 (2006Dh01) and 0.10 ps 6 (2002Jo07).
12389.4 ^f 20	(21 ⁻)		D	J ^π : γ to (19 ⁻).
13159.0 ^a 20	22 ⁺	0.062 ps 35	D	J ^π : γ to 20 ⁺ . T _{1/2} : from DSA. Weighted average of 0.055 ps 35 (2006Dh01) and 0.15 ps 12 (2002Jo07).
15163.2 ^a 21	(24 ⁺)	<0.64 ps	D	J ^π : γ to 22 ⁺ . T _{1/2} : <0.42 ps 22 from DSA (2002Jo07).
15198.8? 21	(24 ⁺)		D	J ^π : possible γ to 22 ⁺ .
17296.5? ^a 21	(26 ⁺)		D	J ^π : possible γ to (24 ⁺).

[†] From least-squares fit to Eγ's. Uncertainty of 0.5 keV used for Eγ when not stated. Normalized $\chi^2=1.2$.

[‡] Weighted average of different measurements have been taken. Most values are from recoil-distance Doppler shift (RDDS) and DSA methods in in-beam γ-ray measurements. Some values are also deduced from B(E2) values in Coulomb excitation. Note that some of the values in 1985Wi01 and 1982An06 seem to be from the same experiment as several authors are common in these two papers. In the averaging procedure, value from only one of these two papers is used when this is the case, even though all values are stated in comments for the sake of completeness.

[#] For high-spin (J>5) levels, assignments are based on γ(θ) and γ(pol) measurements and band associations in in-beam γ-ray studies. Ascending spins with rise in excitation energy are assumed in these reactions. Other complementary arguments are given under comments. For low-spin (J<6) states, the assignments are based on log ft values and ce data for selected transitions.

@ Band(A): γ band, even spins.

& Band(a): γ band, odd spins.

^a Band(B): g.s. band. The band is forked above 22⁺. Average g factor=0.54 5 (1981Wa16), same value for J=2 to 8 levels and J=8 to 12 levels, suggesting no change in g factor in the band up to spin 12. In this g factor, uncertainty of 20% in the calibration of the field is not included.

^b Band(C): Band based on 5⁻, 3065.

^c Band(D): Band based on (5⁻), 3072.

^d Band(E): Band based on (4⁻), 2891.

^e Band(F): Band based on 4⁻, 2764.

^f Band(G): Band based on 3⁻.

Adopted Levels, Gammas (continued)

$\gamma(^{78}\text{Kr})$									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	$\alpha^\&$	Comments
455.033	2 ⁺	454.99 5	100	0.0	0 ⁺	E2			B(E2)(W.u.)=67.9 22
1017.18	0 ⁺	562.15 5	100	455.033	2 ⁺	E2			B(E2)(W.u.)=47 4
		1017		0.0	0 ⁺	E0			$q_K^2(E0/E2)=0.136$ 6, $X(E0/E2)=0.024$ 1, $\rho^2(E0)=0.047$ 13 (2005Ki02 evaluation, data from 1995Gi13).
1119.48	4 ⁺	664.42 5	100	455.033	2 ⁺	E2			B(E2)(W.u.)=88 5
1147.901	2 ⁺	692.88 5	100.0 6	455.033	2 ⁺	M1+E2	+0.45 10		B(M1)(W.u.)=0.0103 21; B(E2)(W.u.)=5.6 24
		1147.87 5	62.4 12	0.0	0 ⁺	E2			B(E2)(W.u.)=1.7 3
1564.76	3 ⁺	416.77 5	17.2 7	1147.901	2 ⁺	(M1)			B(M1)(W.u.)=0.0090 8
		445.28 5	5.3 3	1119.48	4 ⁺	(M1)			Additional information 3.
		1109.72 5	100.0 16	455.033	2 ⁺	E2+M1			B(M1)(W.u.)=0.00228 22
1653.9?		534.4	24 5	1119.48	4 ⁺				
		1198.9 ^c	100 19	455.033	2 ⁺				E_γ : this γ is placed from three other levels, placement here is suspect.
1755.86	2 ⁺	607.94 8	4.7 10	1147.901	2 ⁺	E2+M1	4.0 35		B(E2)(W.u.)=1.5 4; B(M1)(W.u.)=3.E-5 +5-3
		636.27 10	11.9 4	1119.48	4 ⁺	E2			Mult., δ : from $\alpha(K)\text{exp In } ^{78}\text{Rb } \varepsilon$ decay (17.66 min).
		738.66 5	51.7 8	1017.18	0 ⁺	E2			B(E2)(W.u.)=3.2 3
		1300.83 5	100.0 16	455.033	2 ⁺	M1+E2	-1.32 +12-55	3.00×10 ⁻⁴	B(E2)(W.u.)=6.5 5
		1755.94 10	25.4 8	0.0	0 ⁺	[E2]			B(M1)(W.u.)=0.00036 5; B(E2)(W.u.)=0.47 5
1772.93	(1,2) ⁺	1317.90 5	100 6	455.033	2 ⁺	M1,E2			B(E2)(W.u.)=0.042 4
		1772.89 5	24 5	0.0	0 ⁺				
1872.91	4 ⁺	725.06 8	100 3	1147.901	2 ⁺	E2			B(E2)(W.u.)=51 6
		753.37 8	62.5 16	1119.48	4 ⁺	E2+M1	+3.2 +23-12	9.85×10 ⁻⁴ 22	B(M1)(W.u.)=0.0010 +14-10; B(E2)(W.u.)=24 4
		1417.90 8	15.2 9	455.033	2 ⁺	E2			Additional information 4.
1977.91	6 ⁺	858.33 10	100	1119.48	4 ⁺	E2			B(E2)(W.u.)=0.27 4
2007.41	(0 to 3)	859.56 10	100	1147.901	2 ⁺				B(E2)(W.u.)=94 11
2234.19	(0 to 4) ⁺	1779.11 5	100	455.033	2 ⁺	M1,E2			
2240.69	(1,2) ⁺	675.89 9	25.8 18	1564.76	3 ⁺				
		1785.55 12	62.7 18	455.033	2 ⁺	M1,E2			
		2240.69 7	100 3	0.0	0 ⁺				
2299.78	5 ⁺	426.5 ^{#c} 4	44 5	1872.91	4 ⁺	(M1)			B(M1)(W.u.)=0.12 4
		734.98 5	100 5	1564.76	3 ⁺	E2			B(E2)(W.u.)=1.3×10 ² 4
		1180.35 7	40 3	1119.48	4 ⁺	E2+M1	+2 1		B(M1)(W.u.)=0.0010 9; B(E2)(W.u.)=3.8 14
2399.03	3 ⁻	1943.97 5	100	455.033	2 ⁺	(E1)			B(E1)(W.u.)=8.1×10 ⁻⁵ 19
		(2399)		0.0	0 ⁺				B(E3)(W.u.)=16.7 25
2413.41	2 ⁺ ,3 ⁺ ,4 ⁺	848.58 15	53 4	1564.76	3 ⁺	M1,E2			B(E3)(W.u.) from (p,p').
		1265.63 15	100 5	1147.901	2 ⁺	M1,E2			Additional information 5.
		1293.5 ^{#c} 4	38 10	1119.48	4 ⁺				

Adopted Levels, Gammas (continued)

$\gamma(^{78}\text{Kr})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	Comments
2443.37	(1,2) ⁺	687.55 8	70 4	1755.86	2 ⁺	M1,E2		
		1295.45 8	61 4	1147.901	2 ⁺	M1,E2		
		1988.20 15	100 3	455.033	2 ⁺	M1,E2		
		2443.32 8	86.1 16	0.0	0 ⁺			
2472.0	(2,3)	2016.9	100	455.033	2 ⁺	D		
2508.02		2052.96 8	100	455.033	2 ⁺			
2573.36	1 ⁻ ,2 ⁻ ,3 ⁻	1425.56 14	36 3	1147.901	2 ⁺	E1		
		2118.28 8	100 3	455.033	2 ⁺			
2656.12	(0,1)	1508.22 6	50.5 18	1147.901	2 ⁺			
		2201.04 6	100 4	455.033	2 ⁺			
2677.63	3 ⁻	1529.81 12	100 3	1147.901	2 ⁺	E1		
		2222.49 12	53 3	455.033	2 ⁺			
2731.7	(6 ⁺)	753 1	33 13	1977.91	6 ⁺	(M1)		B(M1)(W.u.)=0.009 6
		858.9 7	100 17	1872.91	4 ⁺	E2		B(E2)(W.u.)=31 16
2749.75	5 ⁻	350.5 ^{#c} 6	6 2	2399.03	3 ⁻	E2		B(E2)(W.u.)=210 80
		771.95 7	8.8 8	1977.91	6 ⁺	(E1)		B(E1)(W.u.)=4.5×10 ⁻⁵ 9
		1630.28 6	100.0 25	1119.48	4 ⁺	E1(+M2)	-0.03 4	B(E1)(W.u.)=(5.5×10 ⁻⁵ 9); B(M2)(W.u.)=(0.08 +23-8)
2764.10	(4) ⁻	364.4 ^{#c} 3	20 4	2399.03	3 ⁻			
		1199.33 ^b 5	94.7 ^b 23	1564.76	3 ⁺	E1		B(E1)(W.u.)=5.0×10 ⁻⁵ 14
								I _γ : I _γ (1199γ)/I _γ (1645γ)=0.35 17, 3.6 11, 1.35 In reaction data.
								B(E1)(W.u.)=2.0×10 ⁻⁵ 6
2882.07	3 ⁻	1644.61 5	100.0 23	1119.48	4 ⁺	E1		
		2427.00 8	100	455.033	2 ⁺			
2882.84	(1)	1734.93 7	100 6	1147.901	2 ⁺			
		2882.75 12	46 4	0.0	0 ⁺			
2890.66	(4 ⁻)	1017.7 1	≈45	1872.91	4 ⁺			
		1326.2 4	100 27	1564.76	3 ⁺			
2901.82	(4,5,6 ⁺)	1781.6 4	100	1119.48	4 ⁺			
2968.48		291.0 3	100 21	2677.63	3 ⁻			
		569.1 3	26 11	2399.03	3 ⁻			
		1403.8 7	37 11	1564.76	3 ⁺			
		1820.9 6	21 5	1147.901	2 ⁺			
		1849.3 6	84 21	1119.48	4 ⁺			
2992.55		1844.66 7	100 4	1147.901	2 ⁺			
		2537.37 11	65 9	455.033	2 ⁺			
2993.52	8 ⁺	1015.5 1	100	1977.91	6 ⁺	E2		B(E2)(W.u.)≈85
2999.37	3 ⁻	1852.55 ^b 6	76 ^b 12	1147.901	2 ⁺			E _γ : E _γ not used in least-squares fit procedure.
		1879.87 7	100 15	1119.48	4 ⁺	E1		
3036.5		1917.0 5	100	1119.48	4 ⁺			
3064.71	(5) ⁻	315 ^{#c} 1	91 36	2749.75	5 ⁻	(M1)		B(M1)(W.u.)=0.29 +18-27
								Mult.: ΔJ=(0) transition.
		765 ^{#c}	27 9	2299.78	5 ⁺	[E1]		B(E1)(W.u.)=0.00010 +6-10
		1086.79 7	100 36	1977.91	6 ⁺	E1		B(E1)(W.u.)=0.00013 +8-12

Adopted Levels, Gammas (continued)

$\gamma(^{78}\text{Kr})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	Comments
3072.40	(5 ⁻)	1199.33 ^b 5 1952.91 6	$\approx 28^b$ 100 23	1872.91 1119.48	4 ⁺ 4 ⁺			E_γ : E_γ not used in least-squares fit procedure.
3105.36	3 ⁻ , 4 ⁻ , 5 ⁻	341.26 7 1232.44 7	100 8 87.2 21	2764.10 1872.91	(4) ⁻ 4 ⁺	M1 E1		
3137.4		1158.6 6 2017.4 6	100 31 77 23	1977.91 1119.48	6 ⁺ 4 ⁺			
3161.18	3 ⁻	1288.45 15 1595.8 ^{#c} 5 2013.25 6 2041.52 15	18.3 18 44 17 100 3 28.4 13	1872.91 1564.76 1147.901 1119.48	4 ⁺ 3 ⁺ 2 ⁺ 4 ⁺	E1 E1		I_γ : other: 72 17 In reaction data. B(E2)(W.u.) $\approx$ 95
3202.7	(7) ⁺	902.8 3 1225	100	2299.78 1977.91	5 ⁺ 6 ⁺	E2		
3219.88	(6 ⁻)	455.5 6 470.0 5 488 ^c 920.1 5 1241.7 6	<28 84 13 <40 100 8 64 8	2764.10 2749.75 2731.7 2299.78 1977.91	(4) ⁻ 5 ⁻ (6 ⁺) 5 ⁺ 6 ⁺	[E2] (M1) [E1] (E1) (E1)		B(E2)(W.u.)=14 +15-14 I_γ : other: $\approx$ 160. B(M1)(W.u.)=0.013 5 I_γ : other: 50. B(E1)(W.u.)=5.E-5 5 B(E1)(W.u.)=3.4 $\times$ 10 ⁻⁵ 11 B(E1)(W.u.)=9.E-6 3 Mult.: ΔJ =(0) transition.
3230.48	(1)	2082.60 6 2213.24 6 3230.37 8	71.0 24 41.1 24 100 4	1147.901 1017.18 0.0	2 ⁺ 0 ⁺ 0 ⁺			
3233.55	3 ⁻ , 4 ⁻	1360.63 7 1668.61 15 2114.07 7	66 4 100 6 88 5	1872.91 1564.76 1119.48	4 ⁺ 3 ⁺ 4 ⁺	E1 E1 E1		
3288.36	7 ⁻	294.2 4 538.9 1 1310.2 1	17 6 85 5 100 6	2993.52 2749.75 1977.91	8 ⁺ 5 ⁻ 6 ⁺	(E1) E2 E1(+M2)		B(E1)(W.u.)=0.00063 24 B(E2)(W.u.)=136 18 B(E1)(W.u.)=(4.2 $\times$ 10 ⁻⁵ 6); B(M2)(W.u.)=(0.4 +10-4)
3337.86		338.6 3 1773.1 5 2217.7 7	$\approx$ 29 86 29 100 43	2999.37 1564.76 1119.48	3 ⁻ 3 ⁺ 4 ⁺			
3340.64	(6 ⁻)	268.6 4 276.1 5 449.6 4 591.6 8	22 6 100 36 53 19 4.7 16	3072.40 3064.71 2890.66 2749.75	(5) ⁻ (5) ⁻ (4) ⁻ 5 ⁻	D		
3361.12	4 ⁻ , 5 ⁻ , 6 ⁻	611.37 8	100	2749.75	5 ⁻	M1		
3437.42	(1)	1203.13 5 2289.66 15 2420.27 6 2982.37 16 3437.38 15	1.69 24 29.2 5 88.6 12 100.0 18 87 4	2234.19 1147.901 1017.18 455.033 0.0	(0 to 4) ⁺ 2 ⁺ 0 ⁺ 2 ⁺ 0 ⁺			
3440.4		690.7 5	50 20	2749.75	5 ⁻			

Adopted Levels, Gammas (continued)

$\gamma(^{78}\text{Kr})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	$\delta^\ddagger$	Comments
3440.4		1041.3 7	100 30	2399.03	3 ⁻			
3539.07	(1)	2391.26 12	6.7 3	1147.901	2 ⁺			
		2521.80 12	4.0 5	1017.18	0 ⁺			
		3083.95 5	100.0 13	455.033	2 ⁺			
		3539.00 7	38.9 9	0.0	0 ⁺			
3548.1		1248.1 5	20 10	2299.78	5 ⁺			
		1570.5 6	100 30	1977.91	6 ⁺			
3575.08	(1)	2557.85 10	12.1 10	1017.18	0 ⁺			
		3574.99 6	100.0 10	0.0	0 ⁺			
3607.6	7 ⁻	614.3 5	100 25	2993.52	8 ⁺	E1(+M2)	<0.012	B(E1)(W.u.)>0.00058?; B(M2)(W.u.)<2.3? Mult.: $\Delta J=(0)$ transition.
		1630.4 8	44 13	1977.91	6 ⁺	[E1]		B(E1)(W.u.)=3.0×10 ⁻⁵ 15
3662.17	(1)	1428.08 12	4.6 28	2234.19	(0 to 4) ⁺			
		1906.28 7	7.4 4	1755.86	2 ⁺			
		2514.13 8	100.0 17	1147.901	2 ⁺			
		3662.13 8	5.5 4	0.0	0 ⁺			
3669.22	3 ⁻ ,4 ⁻	1096.02 15	65 3	2573.36	1 ⁻ ,2 ⁻ ,3 ⁻	M1,E2		
		1270.17 6	100 4	2399.03	3 ⁻	M1		
		1796.25 9	99 7	1872.91	4 ⁺			
3703.9	(7 ⁻)	482.7 ^c	≈25	3219.88	(6 ⁻)			
		632.4 5	≈25	3072.40	(5 ⁻)			
		1726.0 5	100 25	1977.91	6 ⁺	D		
3725.48	3 ⁺ ,4 ⁺	823.1 ^{#c} 4	20 9	2901.82	(4,5,6 ⁺)			
		1326.48 9	19.9 23	2399.03	3 ⁻	E1		
		1852.55 ^b 6	100 ^b 8	1872.91	4 ⁺	(M1,E2)		
		1969.6 ^{#c} 6	29 20	1755.86	2 ⁺			
		3270.35 [@] 9	33.1 20	455.033	2 ⁺			
3749.14	(3,4,5 ⁻)	611.3 ^{#c} 4	≈13	3137.4				E _γ : a 611γ is placed from 3361 level In ⁷⁸ Rb ε decay.
		1350.11 8	100 40	2399.03	3 ⁻			
3770.9	(8 ⁺)	1039.2 1	100	2731.7	(6 ⁺)	E2		B(E2)(W.u.)≈1.3×10 ²
3771.32	(7 ⁻)	698.9 4	≈19	3072.40	(5 ⁻)			
		1793.4 3	100 19	1977.91	6 ⁺	[E1]		B(E1)(W.u.)=9.E-5 +4-8
3774.59	(3 ⁻)	872.6 ^{#c} 4	9 3	2901.82	(4,5,6 ⁺)			
		1199.3 ^{#c} 4	21 4	2573.36	1 ⁻ ,2 ⁻ ,3 ⁻			E _γ : 1199γ is placed from three different levels by 1999Su02 In reaction data but placement from 3775 level In ⁷⁸ Rb ε decay is inconsistent with level-energy difference. Additional information 6.
		1375.61 12	42.3 20	2399.03	3 ⁻	M1,E2		
		1901.79 15	20.7 14	1872.91	4 ⁺			
		2209.76 8	27.5 20	1564.76	3 ⁺			
		2626.86 [@] 13	98 4	1147.901	2 ⁺			
		2654.97 [@] 12	40.3 17	1119.48	4 ⁺			

Adopted Levels, Gammas (continued)

<u>$\gamma(^{78}\text{Kr})$ (continued)</u>							Comments
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	
3774.59	(3) ⁻	3319.50 @ 7	100 3	455.033	2 ⁺		
3791.7		653.9 7	20	3137.4			
		1814.1 6	100 20	1977.91	6 ⁺		
3829.45	(1)	1595.32 7	44.1 20	2234.19	(0 to 4) ⁺		
		1822.00 15	100 10	2007.41	(0 to 3)		
		2681.33 14	78 3	1147.901	2 ⁺		
		3374.06 16	91 4	455.033	2 ⁺		
		3829.41 17	15.1 13	0.0	0 ⁺		
3893.27	(1)	1652.68 20	5.35 17	2240.69	(1,2) ⁺		
		1885.97 20	1.57 23	2007.41	(0 to 3)		
		2137.41 8	16.16 23	1755.86	2 ⁺		
		2745.19 12	5.4 4	1147.901	2 ⁺		
		3438.16 15	100 3	455.033	2 ⁺		
		3893.15 6	35.4 5	0.0	0 ⁺		
3918.4	(8 ⁻)	629.4 8	12 3	3288.36	7 ⁻	[M1+E2]	
		698.6 2	100 5	3219.88	(6 ⁻)	E2	B(E2)(W.u.)=140 40
		715 1	4.2 23	3202.7	(7) ⁺	(E1)	B(E1)(W.u.)=3.6×10 ⁻⁵ 21
		924.4 7	10 4	2993.52	8 ⁺	[E1]	B(E1)(W.u.)=3.9×10 ⁻⁵ 18
3919.7		1520.7 6	100	2399.03	3 ⁻		
3922.8		314.8 4	100 30	3607.6	7 ⁻		
		1945.8 6	90 30	1977.91	6 ⁺		
3937.57	(1)	1930.07 7	21.4 17	2007.41	(0 to 3)		
		2789.59 7	33.2 17	1147.901	2 ⁺		
		2920.36 7	59.6 23	1017.18	0 ⁺		
		3482.50 7	86 3	455.033	2 ⁺		
		3937.50 7	100 3	0.0	0 ⁺		
4007.80	(1)	1767.05 8	59 7	2240.69	(1,2) ⁺		
		2000.45 12	20 4	2007.41	(0 to 3)		
		2990.38 12	100 5	1017.18	0 ⁺		
		3552.70 9	80 3	455.033	2 ⁺		
		4007.77 9	51 3	0.0	0 ⁺		
4028.75	(9 ⁻)	740.4 1	100 6	3288.36	7 ⁻	E2	B(E2)(W.u.)=143 18
		1034.7 6	11 3	2993.52	8 ⁺	(E1)	B(E1)(W.u.)=4.1×10 ⁻⁵ 12
4040.39	(1)	1467.24 18	2.9 6	2573.36	1 ⁻ , 2 ⁻ , 3 ⁻		
		1806.22 10	17.9 6	2234.19	(0 to 4) ⁺		
		2284.64 17	12.3 9	1755.86	2 ⁺		
		2892.36 8	100 3	1147.901	2 ⁺		
		3023.20 16	27.0 18	1017.18	0 ⁺		
		4040.20 9	17.3 9	0.0	0 ⁺		
4089.32	(1)	1855.06 8	51.6 16	2234.19	(0 to 4) ⁺		
		2333.32 8	78 3	1755.86	2 ⁺		
		2941.40 7	100.0 16	1147.901	2 ⁺		
		3634.28 20	11.8 22	455.033	2 ⁺		

Adopted Levels, Gammas (continued)

$\gamma(^{78}\text{Kr})$ (continued)							Comments
$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ [†]	E_f	J_f^π	Mult. [‡]	
4089.32	(1)	4089.36 12	16.1 22	0.0	0 ⁺		
4106.0	10 ⁺	1112.2 ^a 3	100	2993.52	8 ⁺	E2	B(E2)(W.u.)=80 12
4201.68	(1)	3053.61 20	59 9	1147.901	2 ⁺		
		3746.58 8	100 5	455.033	2 ⁺		
		4201.44 20	61 7	0.0	0 ⁺		
4213.3	(8 ⁻)	508.6 7	21 8	3703.9	(7 ⁻)		
		872.9 4	100 29	3340.64	(6 ⁻)	(Q)	
4253.7	(9 ⁺)	1051.0 4	100	3202.7	(7 ⁺)	(E2)	B(E2)(W.u.)=120 40
4396.5	(10 ⁺)	289.5 5	23 9	4106.0	10 ⁺	(M1)	B(M1)(W.u.)=1.2 6 Additional information 7. Mult.: $\Delta J=(0)$ transition.
		790 ^c		3607.6	7 ⁻		
		1402.3 6	100 27	2993.52	8 ⁺	[E2]	B(E2)(W.u.)=29 12
4420.86	(1)	3272.88 10	34 3	1147.901	2 ⁺		
		4420.75 15	100 5	0.0	0 ⁺		
4673.1	(9 ⁻)	969.3 6	100 43	3703.9	(7 ⁻)	Q	
		1679.4 6	71 29	2993.52	8 ⁺	D	
4732.0	(9 ⁻)	960.7 6	100	3771.32	(7 ⁻)		
4808.5	(10 ⁻)	890.1 1	100	3918.4	(8 ⁻)	E2	B(E2)(W.u.)>32
4858.7?	(10 ⁺)	1087.8 ^c 2	100	3770.9	(8 ⁺)		E_γ : γ also placed from 6305 level.
4955.4	(10 ⁺)	1184.5	100	3770.9	(8 ⁺)	[E2]	B(E2)(W.u.)=27 11
4965.86	(11 ⁻)	937.1 2	100	4028.75	(9 ⁻)	E2	B(E2)(W.u.)=116 21
5011.52	(1)	3863.51 9	100 8	1147.901	2 ⁺		
		3994.23 9	81 8	1017.18	0 ⁺		
		4556.38 19	43 6	455.033	2 ⁺		
5061.68	(1)	3913.67 16	100	1147.901	2 ⁺		
5180.74	(1)	3173.36 14	65 7	2007.41	(0 to 3)		
		4725.60 11	77 7	455.033	2 ⁺		
		5180.40 13	100 5	0.0	0 ⁺		
5192.50	(1)	4044.31 15	100 3	1147.901	2 ⁺		
		4175.38 19	24.4 17	1017.18	0 ⁺		
		4737.44 22	29 3	455.033	2 ⁺		
5217.1	(10 ⁻)	1003.8 5	100	4213.3	(8 ⁻)	(Q)	
5217.8	12 ⁺	821	≈10	4396.5	(10 ⁺)	[E2]	
		1112.2 ^a 5	100	4106.0	10 ⁺	E2	B(E2)(W.u.)=85 15
5222.58	(1)	3215.22 15	60 7	2007.41	(0 to 3)		
		4074.45 15	100 14	1147.901	2 ⁺		
5244.01	(1)	4095.98 10	26 10	1147.901	2 ⁺		
		5243.85 12	100 4	0.0	0 ⁺		
5333.04	(1)	3325.65 15	62 10	2007.41	(0 to 3)		
		4877.76 25	22 4	455.033	2 ⁺		
		5332.70 22	100 8	0.0	0 ⁺		
5369.56	(1)	3361.99 20	100 15	2007.41	(0 to 3)		

Adopted Levels, Gammas (continued)

$\gamma(^{78}\text{Kr})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult. [‡]	Comments
5369.56	(1)	5369.46 22	52 6	0.0	0 ⁺		
5441.7	(11 ⁺)	1188 1	100	4253.7	(9 ⁺)	[E2]	B(E2)(W.u.)=58 22
5529.19	(1)	3288.33 18	77 14	2240.69	(1,2) ⁺		
		3294.66 25	89 11	2234.19	(0 to 4) ⁺		
		3521.60 25	43 11	2007.41	(0 to 3)		
		3773.37 25	100 9	1755.86	2 ⁺		
		5529.28 22	83 9	0.0	0 ⁺		
5543.68	(1)	3309.41 15	100	2234.19	(0 to 4) ⁺		
5567.79	(1)	5112.70 25	56 7	455.033	2 ⁺		
		5567.50 20	100 10	0.0	0 ⁺		
5586.08	(1)	3351.81 15	100	2234.19	(0 to 4) ⁺		
5776.3	(11 ⁻)	1103.2 7	100	4673.1	(9 ⁻)		
5838.0	(11 ⁻)	1106 1	100	4732.0	(9 ⁻)		
5855.0	(12 ⁻)	1046.5 5	100	4808.5	(10 ⁻)	Q	
6087.2	(13 ⁻)	1121.3 7	100	4965.86	(11 ⁻)	E2	B(E2)(W.u.)=115 25
6305.1	(12 ⁻)	1088 1	100	5217.1	(10 ⁻)		
6480.3	14 ⁺	1262.5 3	100	5217.8	12 ⁺	E2	B(E2)(W.u.)=97 23
6832.7?	(13 ⁺)	1391 ^c	100	5441.7	(11 ⁺)		
6853.3	(13 ⁻)	1077 1	100	5776.3	(11 ⁻)		
7066.8	(14 ⁻)	1211.8 7	100	5855.0	(12 ⁻)		
7392.5	(15 ⁻)	1305.3 7	100	6087.2	(13 ⁻)	[E2]	B(E2)(W.u.)=90 30
7457.1?	(14 ⁻)	1152 ^c	100	6305.1	(12 ⁻)		
7938.0	16 ⁺	1457.6 8	100	6480.3	14 ⁺	(E2)	B(E2)(W.u.)=29 7
8469.2	(16 ⁻)	1402.4 7	100	7066.8	(14 ⁻)		
8882.4	(17 ⁻)	1489.9 9	100	7392.5	(15 ⁻)		
9570.0	18 ⁺	1632 1	100	7938.0	16 ⁺	[E2]	B(E2)(W.u.)=40 16
10061.2	(18 ⁻)	1592 1	100	8469.2	(16 ⁻)		
10551.4	(19 ⁻)	1669 1	100	8882.4	(17 ⁻)		
11314.0	20 ⁺	1744 1	100	9570.0	18 ⁺	[E2]	B(E2)(W.u.)=25 12
12389.4	(21 ⁻)	1838 1	100	10551.4	(19 ⁻)		
13159.0	22 ⁺	1845 1	100	11314.0	20 ⁺	[E2]	B(E2)(W.u.)=22 13
15163.2	(24 ⁺)	2003 1	100	13159.0	22 ⁺	[E2]	B(E2)(W.u.)>1.4
15198.8?	(24 ⁺)	2040 ^c	100	13159.0	22 ⁺		
17296.5?	(26 ⁺)	2098 ^c	≈60	15198.8?	(24 ⁺)		
		2133 ^c	≈100	15163.2	(24 ⁺)		

[†] The values given here represent weighted averages of all available data for energies and intensities of γ rays. The gamma rays for low-spin levels ($J < 5$) are mainly from ⁷⁸Rb decays and for high-spin levels ($J > 5$) from five heavy-ion in-beam γ -ray studies.

[‡] For gamma transitions from low-spin levels ($J < 5$), the assignments are from ce data in ⁷⁸Rb ε decay; and for transitions from high-spin levels, the assignments are based on $\gamma(\theta)$, $\gamma\gamma(\theta)(\text{DCO})$ and $\gamma(\text{linear pol})$ measurements in in-beam γ -ray studies covered in four different reaction dataset. When the assignments are

Adopted Levels, Gammas (continued)

$\gamma(^{78}\text{Kr})$ (continued)

are quadrupole or dipole+quadrupole from angular distribution/ correlation data in in-beam γ -ray experiments, RUL is used to assign E2 or M1+E2. In other cases M1 and E1 are assigned in parentheses when dipole is indicated by angular distribution/correlation data and level J^π 's are well established.

From $^{58}\text{Ni}(^{23}\text{Na},3p\gamma),(^{27}\text{Al},\alpha3p\gamma)$ (1999Su02) only, not reported In ^{78}Rb ε decay. With the intensity of this γ ray reported In the reaction data, it should have been seen In the ^{78}Rb ε data from 1981Ba40. This discrepancy is difficult to explain. IT is considered As questionable by the evaluators.

@ From ^{78}Rb ε decay only; not reported In In-beam γ -ray data, probably because of energy limits set In γ -ray spectrum from reactions.

& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

^a Multiply placed.

^b Multiply placed with intensity suitably divided.

^c Placement of transition in the level scheme is uncertain.

$^{78}\text{Kr}_{42-14}$
 36

From ENSDF

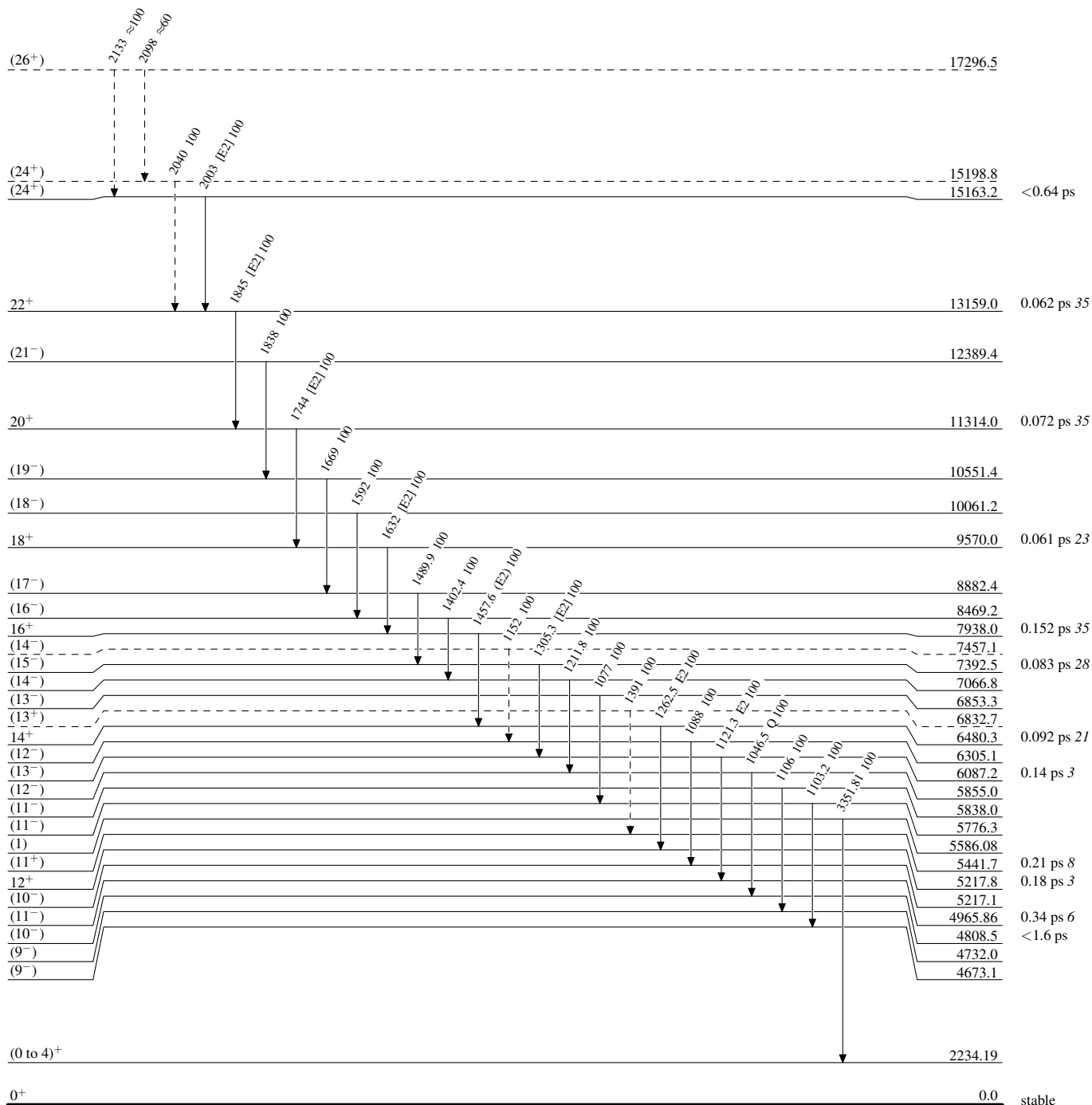
$^{78}\text{Kr}_{42-14}$
 36

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

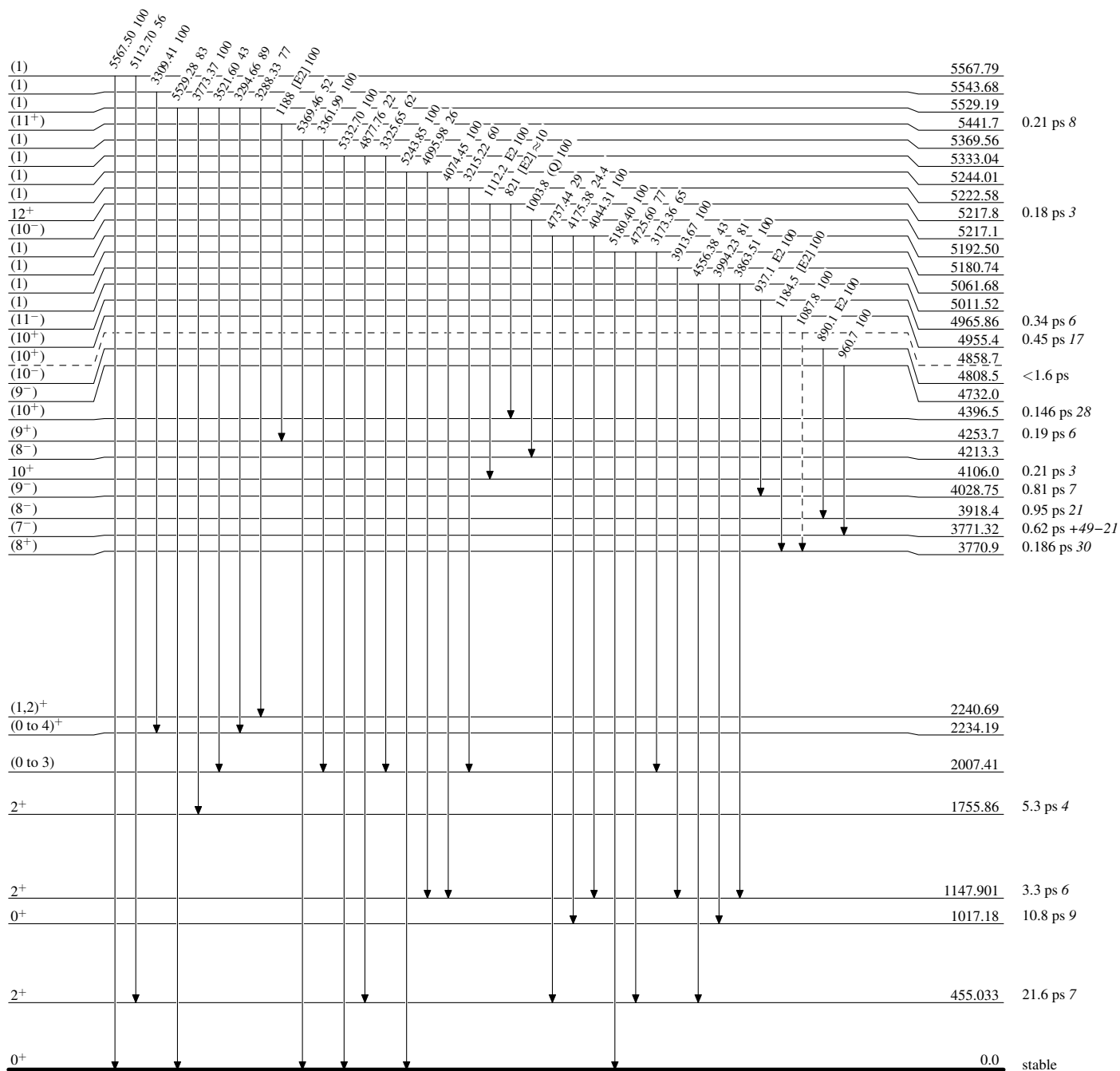
-----► γ Decay (Uncertain)


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

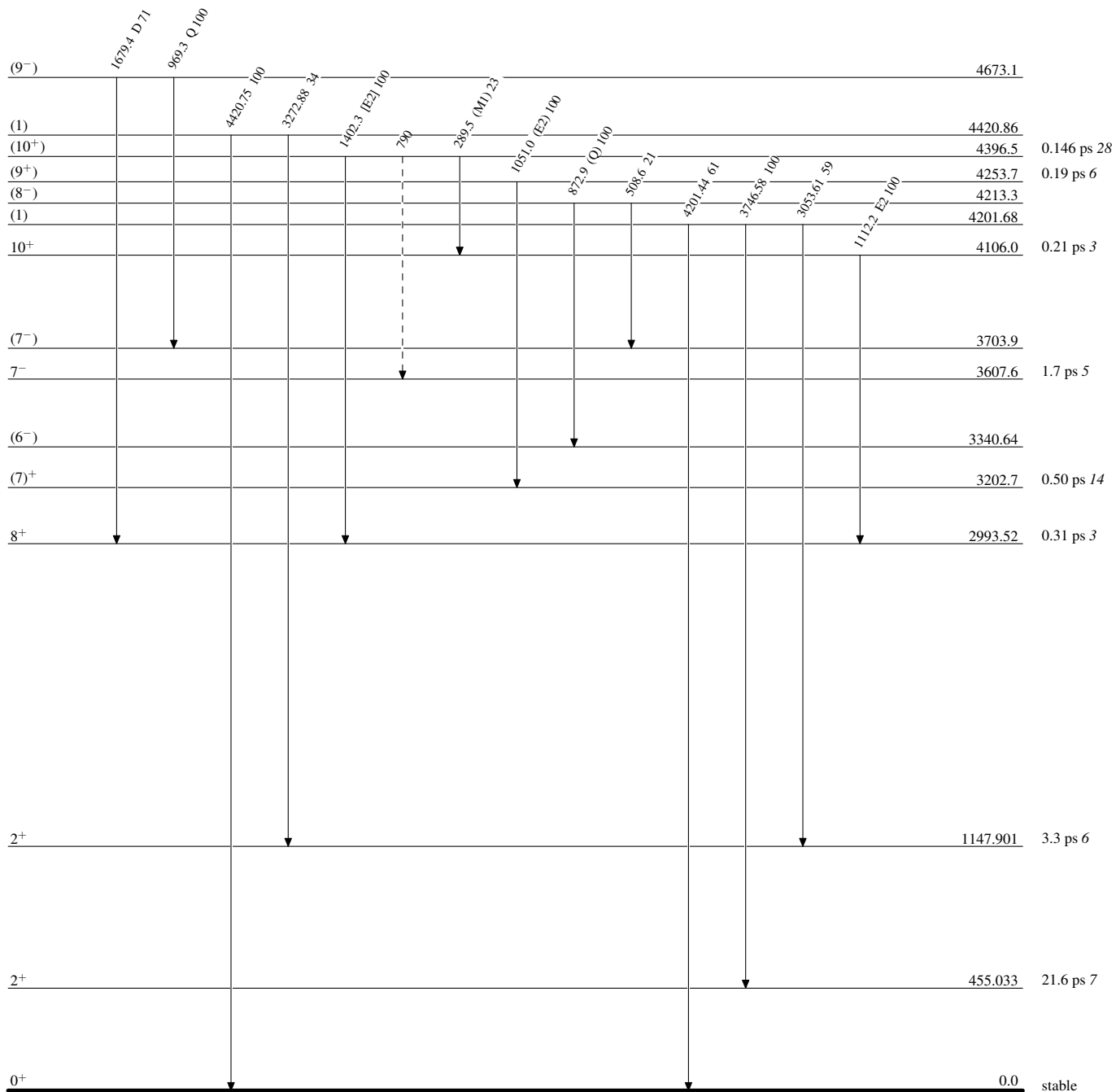
-----► γ Decay (Uncertain)


Adopted Levels, Gammas

Legend

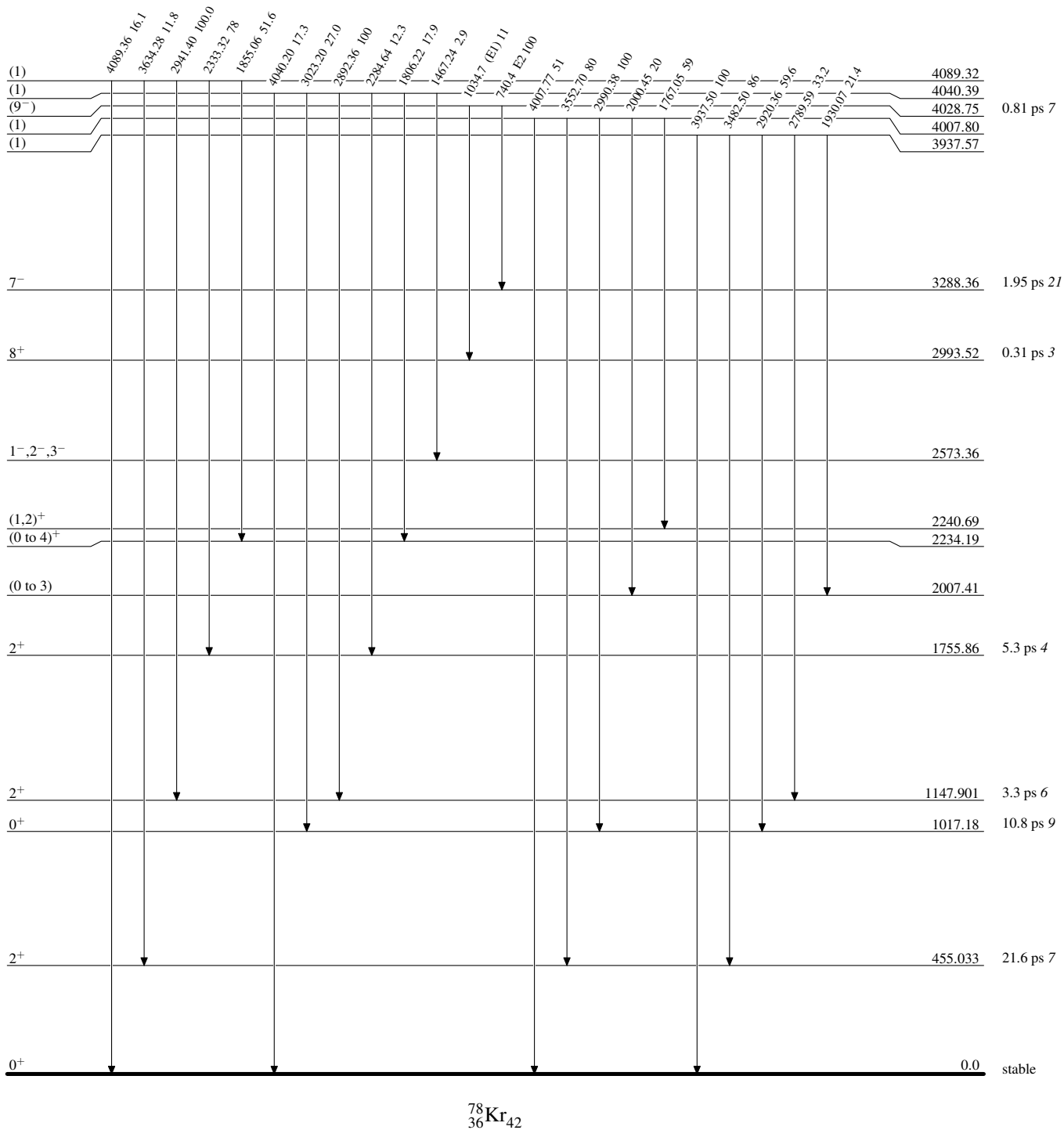
Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

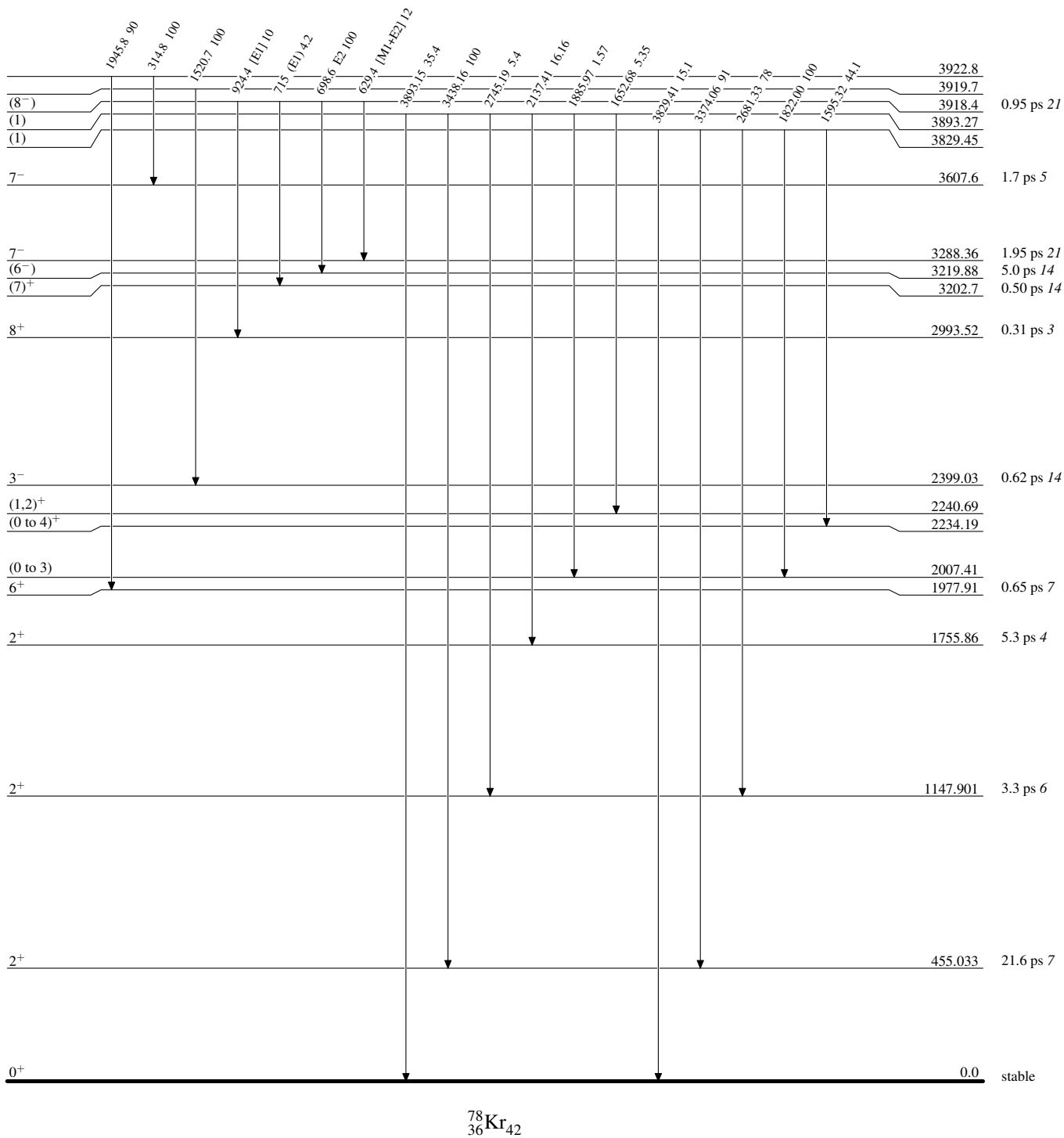
Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level



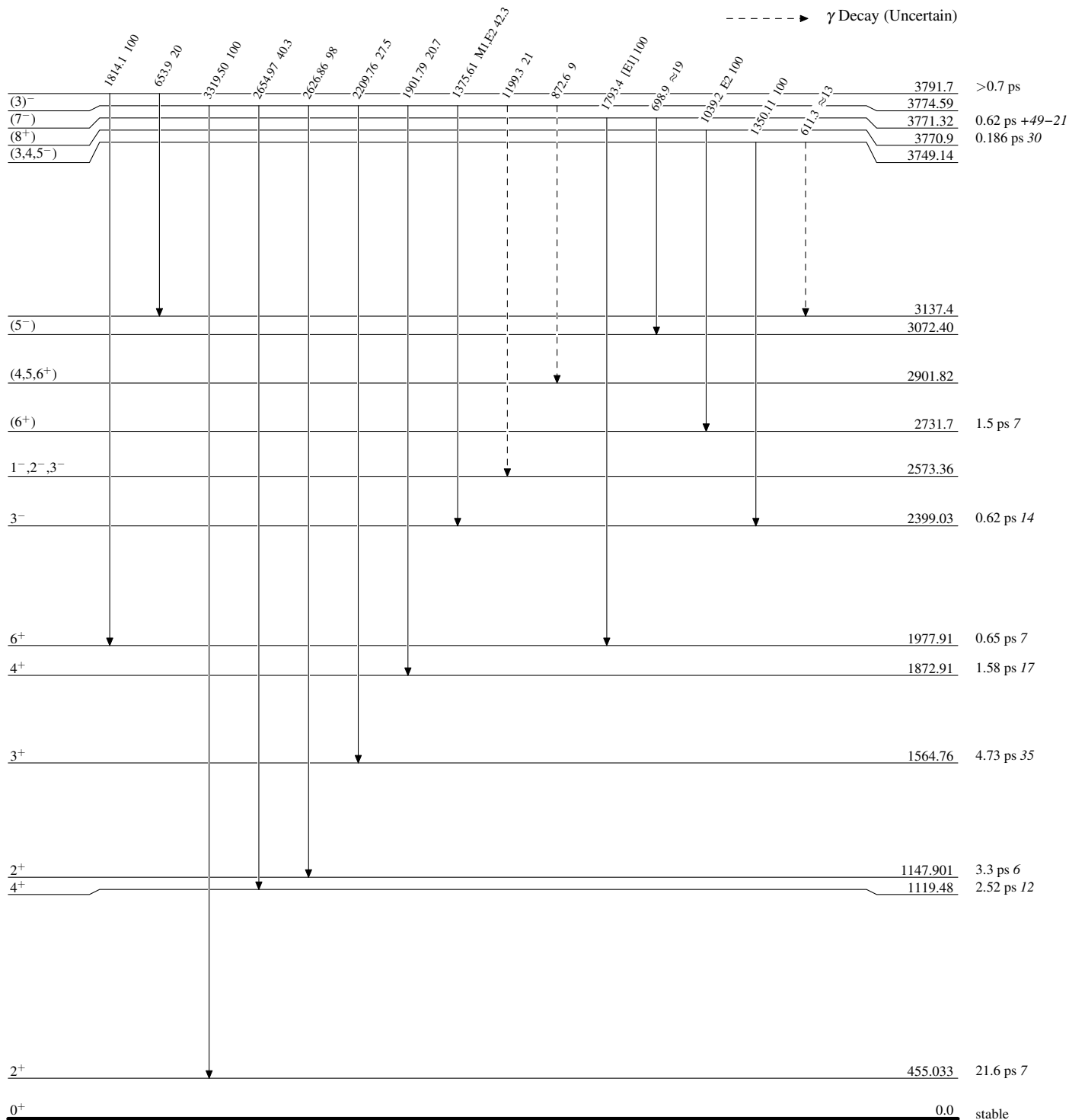
Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level

Legend

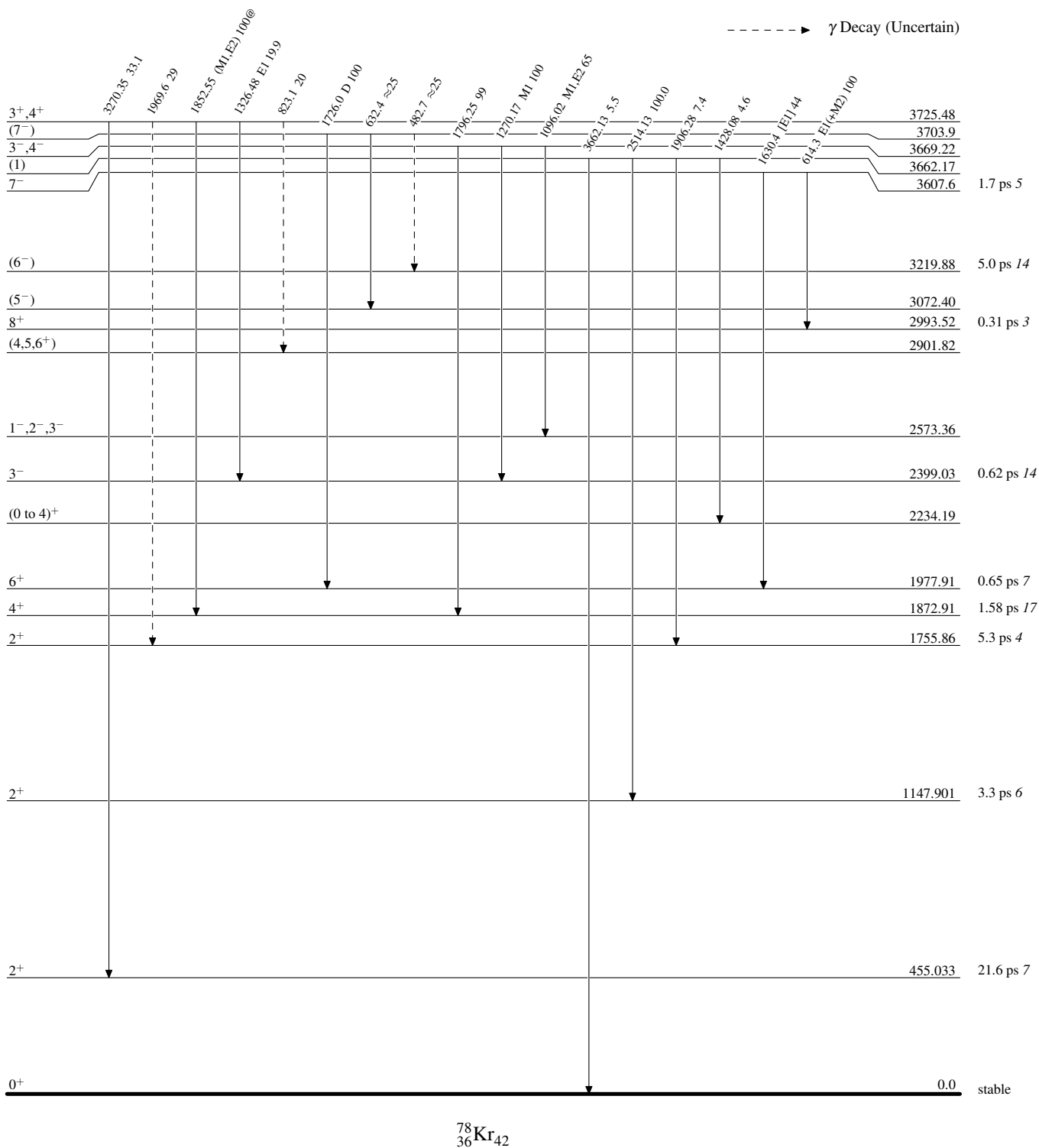
-----► γ Decay (Uncertain)



Adopted Levels, GammasLevel Scheme (continued)

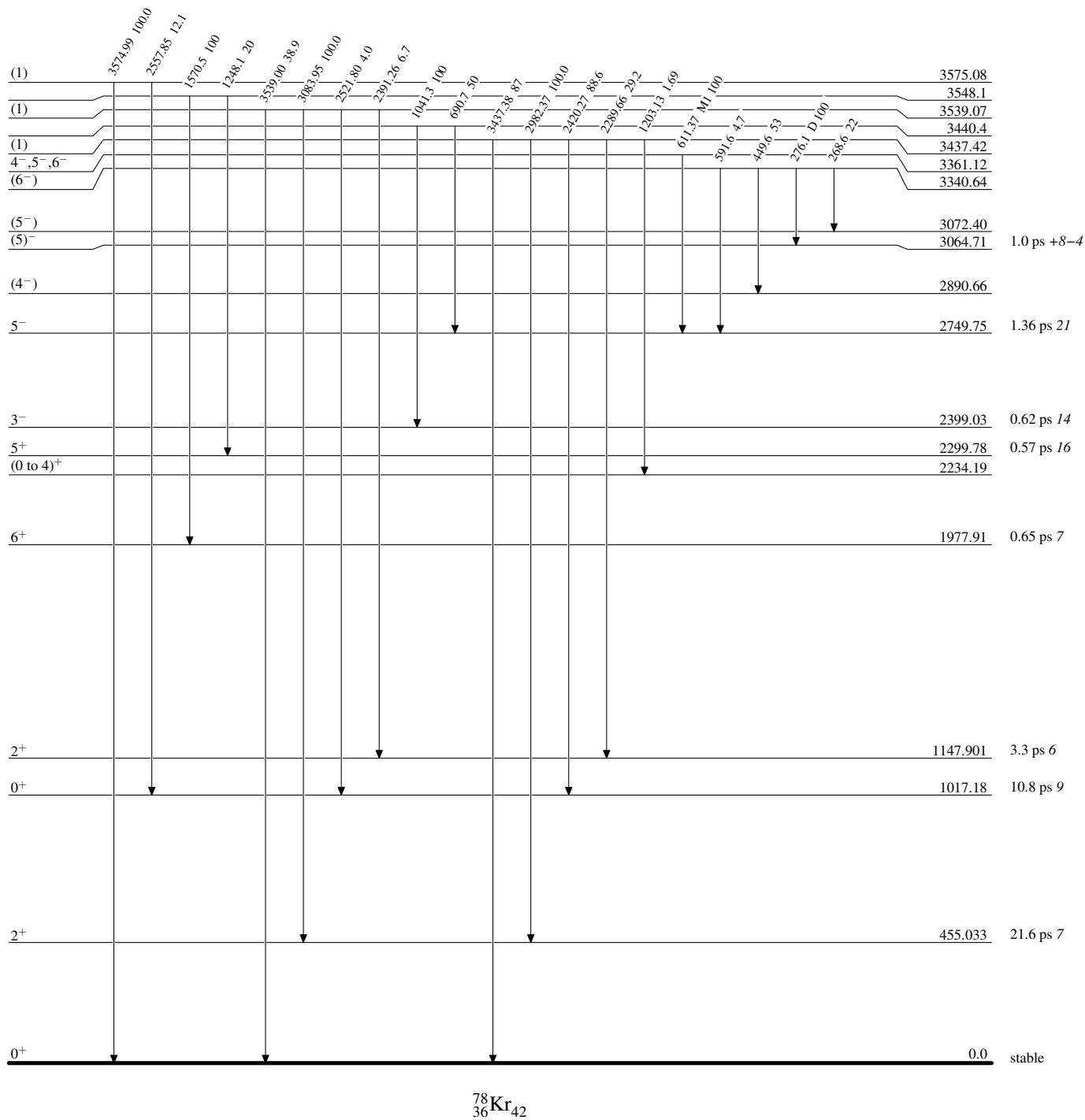
Intensities: Relative photon branching from each level
 @ Multiply placed: intensity suitably divided

Legend

-----► γ Decay (Uncertain)

Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

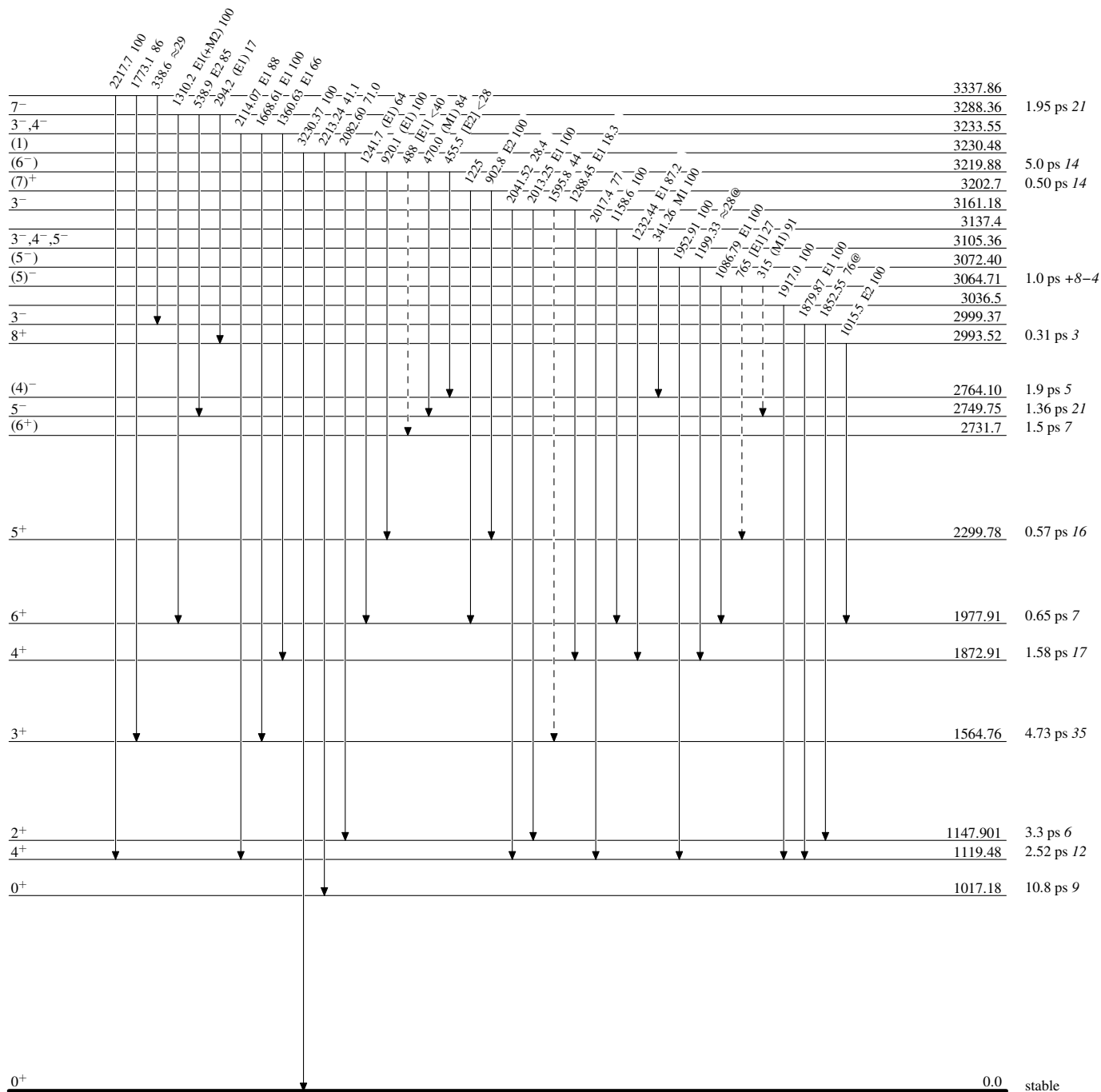


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

-----► γ Decay (Uncertain)

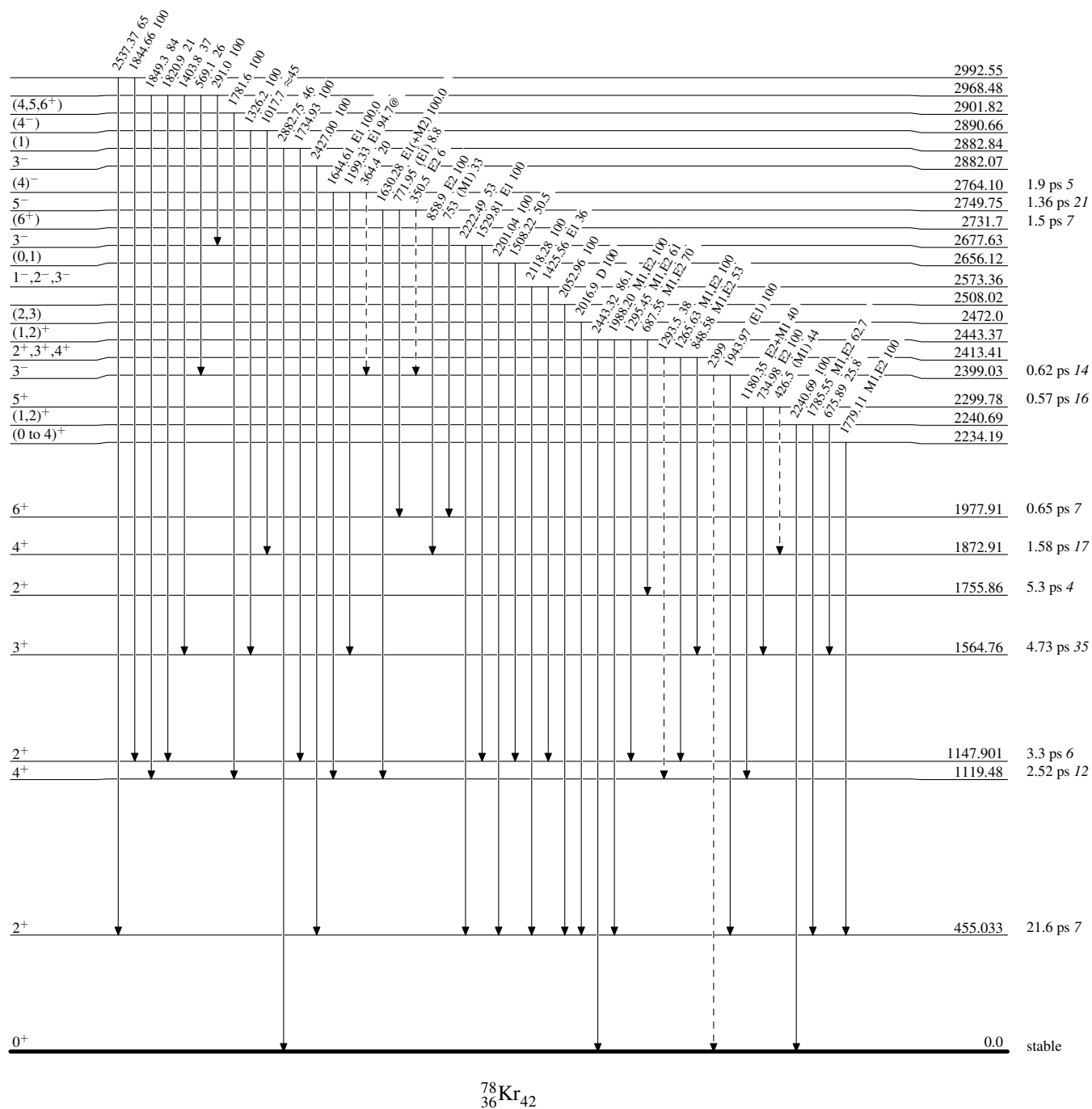
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

@ Multiply placed: intensity suitably divided

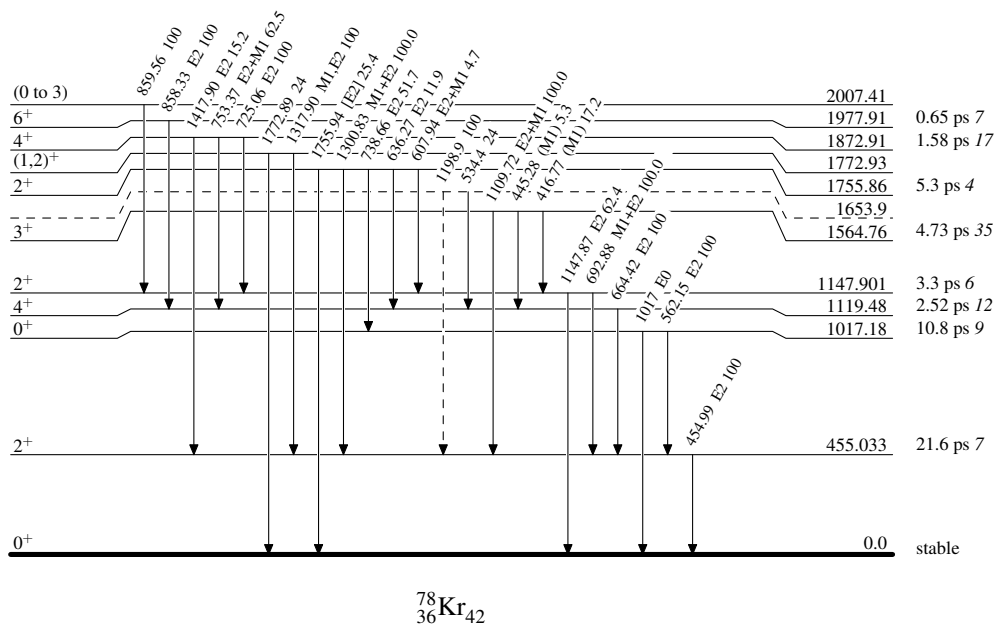
-----► γ Decay (Uncertain)

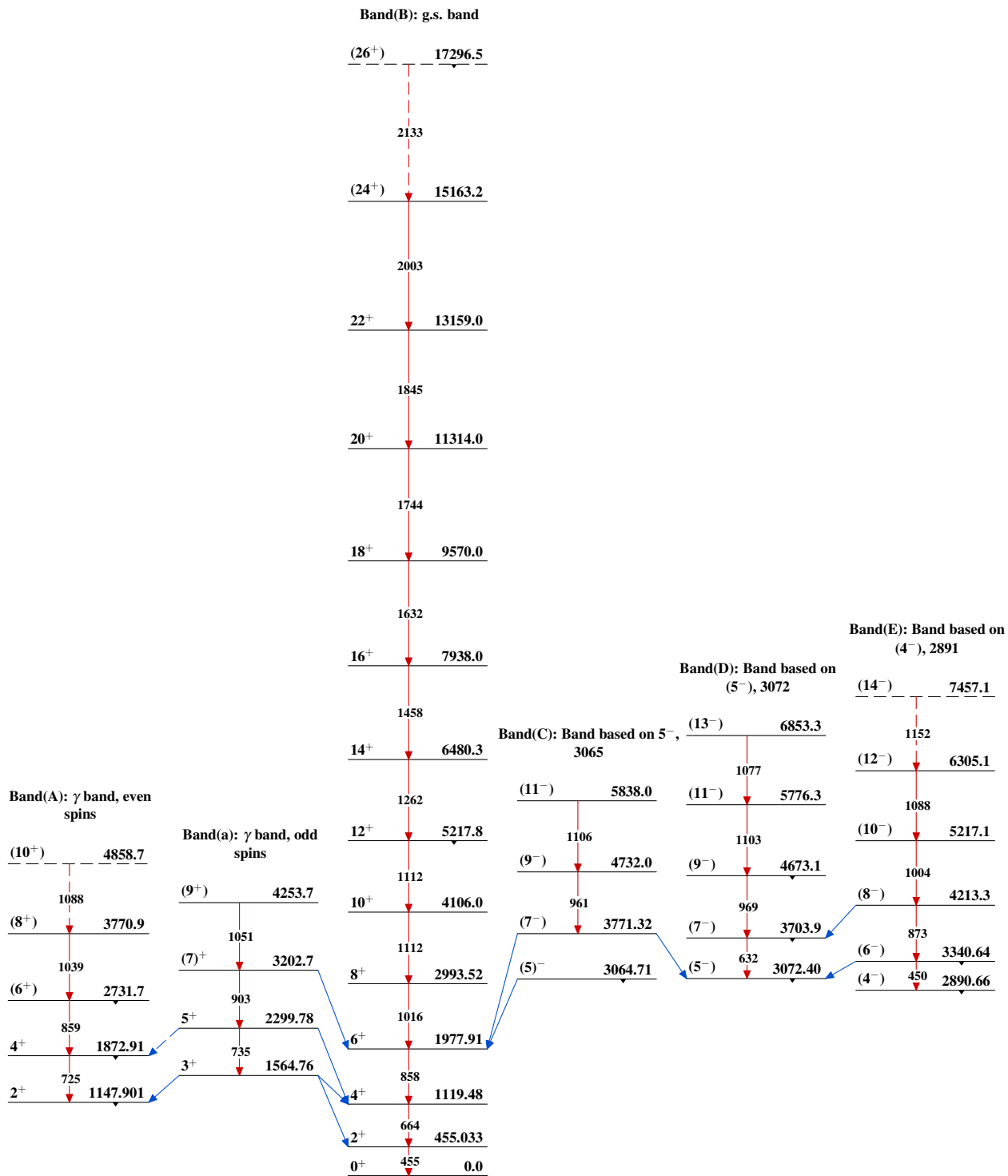
Adopted Levels, Gammas

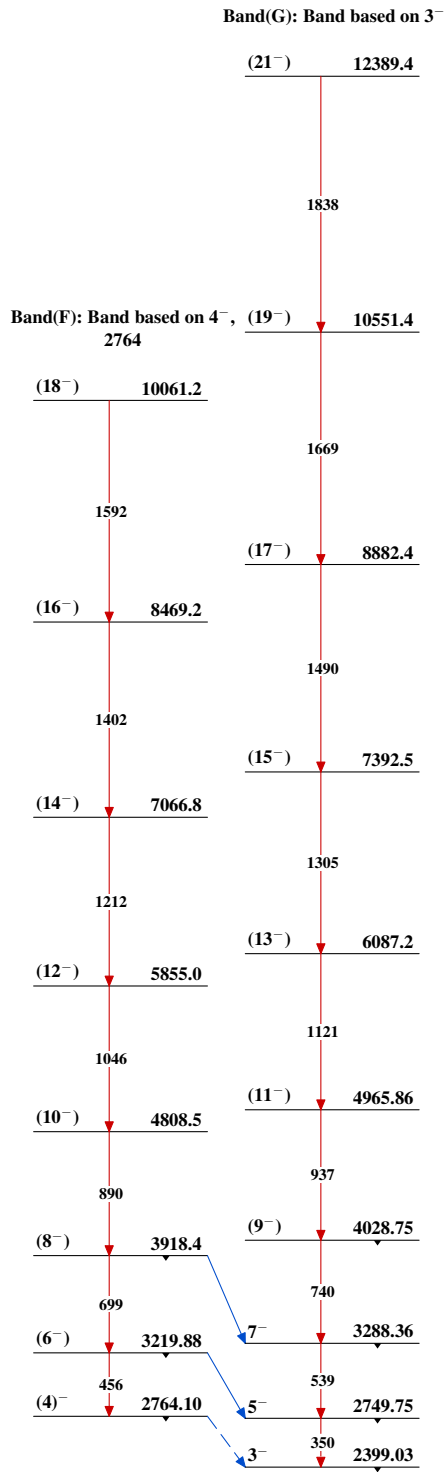
Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
@ Multiply placed: intensity suitably divided

-----► γ Decay (Uncertain) $^{78}_{36}\text{Kr}_{42}$

Adopted Levels, Gammas

Adopted Levels, Gammas (continued) $^{78}_{36}\text{Kr}_{42}$