Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Chen # and F. G. Kondev	NDS 126, 373 (2015)	30-Sep-2013

Q(β^-)=−1892.6 *16*; S(n)=7459.8 *19*; S(p)=3799.0 *8*; Q(α)=3137.3 *8* 2012Wa38
Additional information 1.

^{209}Bi Levels

Each of the six single-particle proton states predicted, on the basis of the shell-model, for 82<N≤126, has been observed in single-particle proton stripping reactions on ^{208}Pb. Except for the 1i$_{13/2}$ and 3p$_{1/2}$ members, these states appear to contain most of the single-particle strength. The missing 3p$_{1/2}$ strength may be concentrated in one of the components of a doublet at 4421+4447 (1970El13; see also 1968Ba34 and 1968El01). The 1i$_{13/2}$ state at 1608, the only single-particle in the 82<N≤126 shell with positive parity, is expected to have its strength fragmented because of coupling with the positive-parity, particle-vibration states. This state is excited in inelastic scattering with $\sigma\approx$20% that of the 13/2$^+$ member of the assumed configuration=π(1h$_{9/2}$)$^{+1}\otimes$3$^-$ multiplet (1971Un01). Also, the 13/2$^+$ member of the multiplet is excited in single-particle transfer (on ^{208}Pb) with strength ≈10% that of the 13/2$^+$ single-particle level (1967Li09,1968El01).

See 1974Sc20 for a discussion of core-polarization effects in the structure of the single-proton states as deduced from (p,p′) inelastic scattering. These authors deduce 8% for the admixture of the configuration=π(1h$_{9/2}$)$^{+1}\otimes$3$^-$ in the 1i$_{13/2}$ state

The group of seven states with E(level)=2492-2741 appear to be well described as a multiplet formed by coupling a 1h$_{9/2}$ single-particle proton state (^{209}Bi g.s.) with the 3$^-$ collective excitation at 2614 in ^{208}Pb. The strongest evidence for this configuration assignment is the excellent agreement between the B(E3) and (β_3)^2 values for the combined seven states (0.54 *7* from Coulomb excitation and 0.11 from (p,p′)) and those for the 3$^-$ state in ^{208}Pb (0.58 *4* and 0.110) as well as the agreement between the energy of the septuplet centroid (2620 with spins as adopted) and that for the 3$^-$ state (2614). The spins of the individual levels in the septuplet have been assigned partly from (p,p′) σ data on the basis of the (2J+1)-rule (1966Ha35), and partly from $\gamma(\theta)$ data in (t,2nγ). The doublet at 2600 was unresolved in (p,p′) and assigned as 11/2+13/2. The doublet was subsequently resolved and the J-assignments of 1966Ha35 confirmed by the Coulomb-excitation data of 1969He07 and 1970Br12 and the (t,2nγ) data of 1983Ma15. See these authors, especially 1970Br12 and 1983Ma15, for a detailed discussion of the spin assignments for the septuplet. From (p,p′) data, 1974Cl07 show that the 3/2$^+$ state at 2492 contains only 64% *7* of the expected strength for the 3/2-member of the multiplet. They suggest that the 2957 level contains an additional 17% *6* of the configuration=π(1h$_{9/2}$)$^{+1}\otimes$3$^-$ strength. See also “particle-vibration coupled states (^{210}Po 0$^+$,4$^+$)” below

The coupling of the 1h$_{9/2}$ ^{209}Bi g.s. to the core states in ^{208}Pb at 3198 (J^π=5$^-$) and 3475 (J^π=4$^-$) would result in a decuplet and a nonet of states, respectively. As pointed out by 1974Cl06, these core states are dominated by configuration=ν(2g$^1_{9/2}$3p$^{-1}_{1/2}$)^2 so that the nineteen states of the decuplet and nonet should be dominated by the configuration=π(1h$_{9/2}$)$^{+1}\otimes\nu$(2g$^1_{9/2}$3p$^{-1}_{1/2}$)^2. 1974Cl06 suggest that an alternate representation of these 19 states is in terms of the coupling of a 3p$_{1/2}$ neutron hole to the 10 states with J=0$^-$ to 9$^-$ in ^{210}Bi identified as members of the configuration=π(1h$_{9/2}$)$\otimes\nu$(2g$_{9/2}$)) multiplet. (see also 1980Cl05 who, on the basis of the (d,t) reaction on a 9$^-$ ^{210}Bi target, suggest that the levels seen in that reaction have a dominant configuration=9$^-\otimes\nu$(nlj)$^{-1}$ structure). Insofar as this alternate representation is correct, the 19 states should be populated in ^{209}Bi(p,p′) at proton energies corresponding to excitation of isobaric analogs in ^{210}Po. Of the 10 ^{210}Bi core states mentioned above, a group of 8 states with energies in the range 2766-3170 in (p,p′) (two states assumed doublets) has been interpreted as the decuplet with configuration=π(1h$_{9/2}$)$^{+1}\otimes$5$^-$ (1974Cl06,1974Cl07). These states account for 88% *6* of the ^{208}Pb L=5 strength (1974Cl07). The centroid of the decuplet is at 3090 (with spins as adopted). 1974Cl07 observe that the 2987 19/2$^+$ level contains only 59% *7* of the strength expected for the configuration=π(1h$_{9/2}$)$^{+1}\otimes$5$^-$ 19/2$^+$ member of the decuplet, which implies strong fragmentation of this configuration. They suggest that the 3957 level contains most of the missing strength. The spin assignments for the assumed members of the decuplet (except for the 19/2$^+$ level) from 1974Cl06 and 1974Cl07 are based on the strength in ^{209}Bi(p,p′) via direct scattering and in ^{209}Bi(p,p′) via analog resonances. The spin of 19/2$^+$ for the 2987 level suggested by these authors is confirmed by the γ-branching observed by 1978Be17 in ^{208}Pb(^{7}Li,α2nγ) but is in disagreement with that based solely on the (2J+1)-rule in (p,p′) (see 1975Wa03). For other differences between assignments based on the (2J+1)-rule and those of 1974Cl06 and 1974Cl07, see 1975Wa03. Confirming arguments for J are based on $\gamma(\theta)$ in (t,2nγ). A group of 9 states with

Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

energies in the range 2919 to 3503 have been interpreted by 1974Cl06 as the above mentioned multiplet with configuration=$\pi(1h_{9/2})^{+1}\otimes 4^-$. The spin assignments for the assumed members of this multiplet from 1974Cl06 are based on the strength of resonances in ^{209}Bi(p,p′) excitation functions at energies corresponding to isobaric analogs of states with known spin in ^{210}Bi along with the assumption that the 19 states of the decuplet and nonet exhaust all the spins possible from the two-particle, one-hole configurations involving the $1h_{9/2}$ proton and $1g_{9/2}$ neutron single-particle and $3p_{1/2}$ neutron single-hole states. See 1974Cl06 for detailed assignments. Confirming arguments for J are based on $\gamma(\theta)$ in (t,2nγ). See 1983Ma15 for a calculation of the energies and wave functions for all nineteen states. The calculation is based on the configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(1g^{1}_{9/2}3p^{-1}_{1/2})^{2}$. representation.

On the basis of a comparison of experimental energies and spectroscopic factors with values predicted by a core-coupling calculation, 1972Ba81 in (t,α) propose configurations of the type configuration=$(0^+\otimes\pi(nlj)^{-1})+(3^-\otimes\pi(nlj))$ for several of the states seen in (t,α), as indicated below. The authors also propose configuration=$(0^+\otimes\pi(nlj)^{-1})+(4^+\otimes\pi(nlj)^{-1})$ for states at 4000 *15* and 4120 *15*. It is not clear whether these correspond to states seen at these energies in other reactions, or whether they are separate states

For a discussion of particle-vibration coupling involving ^{208}Pb core states other than those discussed above, see 1974Cl06, 1974Cl07, 1975Wa03, and 1983Ma15.

Cross Reference (XREF) Flags

A	^{209}Pb β^- decay	M	^{208}Pb(^{3}He,dγ)	Y	^{209}Bi(e,n): giant resonance
B	^{209}Po ε decay	N	^{208}Pb(α,t)	Z	^{209}Bi(n,n′γ)
C	^{213}At α decay	O	^{208}Pb(^{7}Li,α2nγ)	Others:	
D	^{207}Pb(α,d)	P	^{208}Pb(^{7}Li,^{6}He),(pol ^{7}Li,^{6}He)	AA	^{209}Bi(p,p′)
E	^{208}Pb(p,γ)	Q	^{208}Pb(^{11}B,^{10}Be)	AB	^{209}Bi(p,p′): giant resonance
F	^{208}Pb(p,γ): giant resonance	R	^{208}Pb(^{12}C,^{11}B)	AC	^{209}Bi(d,d′)
G	^{208}Pb(p,γ): IAR	S	^{208}Pb(^{16}O,^{15}N)	AD	^{209}Bi(α,α′): giant resonance
H	^{208}Pb(p,p′),(pol p,p′): IAR	T	^{208}Pb(^{32}S,Xγ)	AE	^{210}Bi(d,t): target=9$^-$ isomer
I	^{208}Pb(d,n)	U	^{209}Bi(γ,γ′)	AF	^{210}Po(t,α)
J	^{208}Pb(d,nγ)	V	^{209}Bi(γ,n)	AG	Coulomb excitation
K	^{208}Pb(t,2nγ)	W	^{209}Bi(γ,p),(e,p): IAR	AH	Inelastic scattering
L	^{208}Pb(^{3}He,d)	X	^{209}Bi(e,e′): giant resonance	AI	Muonic atom

Single-particle states

Particle-vibration coupled states (^{208}Pb 3$^-$)

Particle-vibration coupled states (^{208}Pb 4$^-$, 5$^-$)

Particle-vibration coupled states (^{210}Po 0$^+$,4$^+$)

E(level)†	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	9/2$^-$	2.01×10^{19} y *8*	ABCDEF IJKLMNOPQRSTU X Z	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI %α=100 μ=+4.1103 *5* (1953Ti01) Q=−0.55 *1* (1983De07) J$^\pi$: atomic beam (1976Fu06), L(α,t)=L(^{3}He,d)=5 from 0$^+$.

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	J^π	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: from α-decay in 2012Be06. 1.9E19 y *2* from 2003De11 deduced only from the partial width for the ground state decay. octupole moment=+0.5 (1976Fu06). μ: from 1996Ba94 re-evaluation with correction for diamagnetism of +4.1106 2 by NMR in 1953Ti01. Q: from atomic beam method in 1983De07. Others: −0.37 *3* (muonic x-ray hyperfine structure, 1972Le07), −0.40 *5* (1974Ho40), −0.39 *3* (optical spectroscopy, 1967Di04, 1970Ge10), −0.50 *8* (pionic x-ray hyperfine structure, 1978Be24), −0.5 *2* (pionic x-ray hyperfine structure). configuration=$\pi(1h_{9/2})^{+1}$. π^0 emission not found (1989St01). Isotope shift(^{207}Bi-^{209}Bi)=0.0999 cm^{-1} *20* (1985Ba21). Charge density distribution measured (1973Si20,1978Eu01).
896.28 *5*	7/2$^-$	8.2 ps *12*	B DE IJKLMNOPQRSTU Z	XREF: Others: AA, AC, AF, AG, AH J^π: L(^{3}He,d)=L(α,t)=3, 896.28γ M1+E2 to 9/2$^-$. $T_{1/2}$: from B(E2)↑=0.00261 *16* and the adopted mixing ratio of δ(896.28γ)=−0.62 *6*. B(E2)↑=0.00261 *16*, weighted average of 0.0018 *6* (1969He07), 0.0024 *2* (1972Ha59), and 0.00275 *14* (1973Kr02). Other: B(E2)↑=0.00139 *+16−23* (1970Br12), but the bombarding energy was such that the assumption of a pure Coulomb excitation may not be valid (1973Kr02). configuration=$\pi(2f_{7/2})^{+1}$.
1608.57 *5*	13/2$^+$	0.23 ns *13*	DE I KLMNOPQRST Z	XREF: Others: AA, AC, AF, AG, AH, AI Q=−0.37 *3* (1972Le07) J^π: L(α,t)=L(^{3}He,d)=6, 1608.53γ M2+E3 to 9/2$^-$. $T_{1/2}$: from B(E3)↑=0.026 *3* and the adopted mixing ratio of δ(1608.53γ)=+0.33 *10*. B(E3)↑=0.026 *3*, weighted average of B(E3)↑=0.022 *8* from Coulomb excitation (1969He07) and B(E3)↑=0.027 *3* from (p,p′) (1974Sc20). Other B(E3)↑=0.0124 *32* (1970Br12), but see also the comment to the 896-keV level. Q: from muonic x-ray hyperfine structure (1972Le07). configuration: probable a mixture of $\pi(1i_{13/2})^{+1}$ and $\pi(1h_{9/2})^{+1}\otimes3^-$ (1974Cl07). Isomer shift measured in muonic atom: 3.7 *+6−8* (1974Ba77), 3.5 *6* (1972Le07), 3.8 *3* (1984Ru08).
2442.92 *6*	1/2$^+$	11.3 ns *4*	JK M O Z	XREF: Others: AA, AC, AD, AE, AF XREF: AF(2430). J^π: L(t,α)=(0), 1546γ E3 to 7/2$^-$. $T_{1/2}$: from 1546.7γ(t) in (n,nγ) (1996De48). Other: 10 ns *2* from ce(K)(896γ)(t)(1978El07) in (d,nγ). $T_{1/2}$>2 ps from 1546(t) in (^{7}Li,α2nγ), but note that the authors place the 1546γ from the 3154-keV doublet. configuration: probable a mixture of $\pi(3s_{1/2})^{-1}$ and $\pi(2f_{7/2})^{+1}\otimes3^-$ (1972Ba81).
2492.86 *6*	3/2^{+}&	≈31 ps	K MNO Z	XREF: Others: AA, AC, AE, AF, AG, AH, AI XREF: AF(2480)AH(2480). J^π: L(α,t)=2, L(p,p′)=3. RUL rules out mult(49.94γ to 1/2$^+$)=pure E2.

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: from B(E3)↑=0.021 *3* in Coulomb excitation (1969He07) and the adopted branching for the 2492.86γ. B(E3)↑=0.021 *3*, from 0.053 *7* in Coulomb excitation (1969He07). configuration=$\pi(1h_{9/2})^{+1}\otimes3^-+\pi(2d_{3/2})^{-1}$ (1972Ba81).
2564.14 *10*	$(9/2)^+$[&]	0.015 ps *3*	K O U Z	XREF: Others: AA, AC, AG, AI μ=3.5 *7*; Q=+0.11 *5* (1972Le07) J^π: L(p,p′)=3, 2564γ E1+E3 to 9/2⁻. $T_{1/2}$: weighted average of 0.015 ps *3*, from $\Gamma(\gamma_0)^2/\Gamma$=0.030 eV *5* in (γ,γ′) (1969Me21) for J=9/2, and 0.014 ps *11*, from DSAM in (^{7}Li,α2nγ) (1972Ha59). B(E3)↑=0.073 *11*, weighted average of B(E3)↑=0.074 *11* from Coulomb excitation (1969He07) and 0.072 *14* in muonic atom (1972Le07). μ,Q: from muonic x-ray hyperfine structure in 1972Le07. configuration=$\pi(1h_{9/2})^{+1}\otimes3^-$ (1974Cl07,1983Ma15). Isomer shift=6.2 *5* (1974Ba77), 5.8 *5* (1972Le07), 6.6 *3* (1984Ru08) in Muonic atom dataset.
2583.02 *8*	$(7/2)^+$[&]	0.31 ps *10*	K O U Z	XREF: Others: AA, AC, AG B(E3)↑=0.052 *8* (1969He07) J^π: L(p,p′)=L(e,e′)=3, 1686.66γ E1(+M2) to 7/2⁻, 2583.07γ E1+E3 to 9/2⁻. $T_{1/2}$: from DSAM in (^{7}Li,α2nγ) (1972Ha59). Other: 0.15 ps +*14*−*7* from DSAM in Coulomb excitation (1970Br12). configuration=$\pi(1h_{9/2})^{+1}\otimes3^-$ (1974Cl07,1983Ma15). β_3=0.122 *6* from inelastic scattering (1967Al14).
2599.91 *9*	$11/2^+$[&]	36 fs *10*	d Kl n U Z	XREF: Others: AA, AC, AG J^π: L(α,t)=6 for 2600 doublet, 2599.9γ E1+E3 to 9/2⁻. $T_{1/2}$: from $\Gamma(\gamma_0)^2/\Gamma$=0.0090 eV *24* in (γ,γ′) (1969Me21) for J=11/2 and the adopted branching ratio of $\Gamma(\gamma_0)/\Gamma$=0.847 *18*. configuration=$\pi(1h_{9/2})^{+1}\otimes3^-$ (1983Ma15). B(E3)↑=0.094 *14* in Coulomb excitation (1969He07).
2600.92 *5*	$13/2^+$[&]	0.44 ps *14*	d K nO Z	XREF: Others: AA, AC, AG J^π: L(α,t)=6 for 2600 doublet, 992.35γ M1(+E2) to 13/2⁺, 140.13γ M1(+E2) from 15/2⁺. $T_{1/2}$: from DSAM in (^{7}Li,α2nγ) (1972Ha59). Other: 0.24 ps +*14*−*10* in Coulomb excitation (1969He07). configuration=$\pi(1h_{9/2})^{+1}\otimes3^-$ (1983Ma15). B(E3)↑=0.108 *15* from B(E3)=0.072 *11* in Coulomb excitation (1969He07).
2617.34 *6*	$5/2^+$[&]	7.2 ps *11*	K O Z	XREF: Others: AA, AC, AG J^π: L(p,p′)=3, 124.48γ M1(+E2) to 3/2⁺, and 1721.08γ E1(+M2) to 7/2⁻. $T_{1/2}$: from adopted B(E3)↑=0.034 *5*, by assuming a pure E3 transition for 2617.35γ. Other: >2 ps from DSAM in (^{7}Li,α2nγ) (1972Ha59). B(E3)↑=0.034 *5* from B(E3)=0.057 *9* in Coulomb excitation (1969He07). configuration=$\pi(1h_{9/2})^{+1}\otimes3^-$ (1974Cl07,1983Ma15).
2741.05 *5*	$15/2^+$	9.1 ps *12*	K O Z	XREF: Others: AA, AC, AE, AF, AG, AH, AI

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)[†]	J^{π}	$T_{1/2}$	XREF	Comments
				μ=6.2 *12*; Q=0.0 *4* (1972Le07) J^{π}: L(d,t)=1 from 9^-, L(p,p′)=3, 2741.03γ E3 to $9/2^-$. $T_{1/2}$: from the adopted B(E3)↑=0.077 10 and branching ratios. Other: >2 ps from DSAM in (^{7}Li,α2nγ) (1972Ha59). B(E3)↑=0.077 *10* from B(E3)=0.048 *6*, weighted average of 0.048 *7* in Coulomb excitation (1969He07) and 0.047 *10* in Muonic atom (1972Le07). μ,Q: From muonic x-ray hyperfine structure in 1972Le07. configuration=$\pi(1h_{9/2})^{+1}\otimes3^-$ (1974Cl07,1983Ma15). For isomer shift measurement see Muonic atom (1972Le07).
2766.66 *6*	$3/2^{+}$[a]		K M Z	XREF: Others: AA, AC, AF J^{π}: L(p,p′)=5, 323.74γ M1 to $1/2^+$. Note, that L(p,p′)=4 in 1975Wa03. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1974Cl07,1983Ma15).
2826.1 *4*	$5/2^-$	6.9 fs *9*	DE I KL NOPQRS U Z	XREF: Others: AA, AC, AF, AG, AH J^{π}: L(^{3}He,d)=L(α,t)=3, 2826.0γ E2 to $9/2^-$. $T_{1/2}$: from $\Gamma(\gamma_0)^2/\Gamma$=0.034 eV *4* in ($\gamma$,$\gamma'$) for J=5/2 and the adopted branching ratio of $\Gamma(\gamma_0)/\Gamma$=0.718 *16* Other: <14 fs from DSAM in (^{7}Li,α2nγ) and 7.8 fs *27* from B(E2)↑=0.029 10 in Coulomb excitation (1970Br12). B(E2)↑=0.029 *10* in Coulomb excitation (1970Br12). configuration: probable a mixture of $\pi(2f_{5/2})^{+1}$ and $\pi(1h_{9/2})^{+1}\otimes2^+$ (1974Cl07).
2845.20 *6*	$1/2^+$		K M Z	XREF: Others: AA J^{π}: 402.27$\gamma(\theta)$ is isotropic. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1974Cl07,1983Ma15).
2916.62 *7*	$(1/2)^+$		D K M Z	XREF: Others: AA J^{π}: 149.98γ M1+E2 to $3/2^+$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{4^-}$ (1974Cl07,1983Ma15).
2955.93 *7*	$(3/2)^+$		K M Z	XREF: Others: AA, AC, AF J^{π}: L(p,p′)=3, 677.8γ from $1/2^-$. Spin was tentatively suggested by 1972Ba81, based on strength in (t,α) and possible L=2 with configuration=$\pi(2d_{3/2})^{-1}$. A $\pi(1h_{9/2})^{+1}\otimes3^-$ component is suggested by 1974Cl07 on the basis of (p,p′) data, and by 1983Ma15 on the basis of (t,2nγ) data. Gammas to $1/2^+$ and $5/2^+$ are observed in (t,2nγ). The 2955γ to $9/2^-$ is reported only in (n,n′γ). See comment on the 2955γ. configuration=$\pi(2d_{3/2})^{-1}+\pi(1h_{9/2})^{+1}\otimes3^-$ (1972Ba81).
2986.80 *5*	$19/2^{+}$[a]	17.9 ns *5*	D K O Z	XREF: Others: AA, AC, AE, AH μ=3.50 *8* (1978Be17) XREF: D(2979). J^{π}: L(d,t)=1 from 9^-, L(p,p′)=5 from $9/2^-$, 245.73γ E2 to $15/2^+$. $T_{1/2}$: weighted average of 17.9 ns *5* from γ(t) in (n,n′γ) (1996De48), and 18 ns *1* from γ(t) in (^{7}Li,α2nγ) (1972Ha59). μ: From g=0.368 *8* in (^{7}Li,α2nγ) by time dependent perturbed angular distribution (1978Be17). configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1974Cl07,1983Ma15).
3038.88 *10*	$5/2^{+}$[a]		D K Z	XREF: Others: AA, AC, AH

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)[†]	J^π	$T_{1/2}$	XREF	Comments
				J^π: L(p,p′)=5, 2142.78γ E1 to $7/2^-$ and 272.2γ (M1+E2) to $3/2^+$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1974Cl07,1983Ma15).
3090.16 *8*	$(7/2)^{+}$[a]		K Z	XREF: Others: AA, AC J^π: L(p,p′)=5, 2194.1γ to $7/2^-$ and 3089.48γ (E1+M2) to $9/2^-$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1983Ma15).
3119.48 *8*	$3/2^-$	0.021 ps *14*	E I KLMNOPQRS Z	XREF: Others: AA, AB, AD XREF: N(3139). J^π: L(^{3}He,d)=1, 2223.23γ E2 to $7/2^-$. $T_{1/2}$: from DSAM in (^{7}Li,α2nγ) (1972Ha59). configuration=$\pi(3p_{3/2})^{+1}$.
3132.97 *9*	$11/2^{+}$[a]		d K Z	XREF: Others: AA, AC, AE, AH J^π: 3132.96γ E1 to $9/2^-$ and 1524.1γ to $13/2^+$. L(p,p′)=5, but the peak is a probable doublet, based on σ and on the observation that the (p,p′) excitation function appears to resonate at both the $J^\pi=5^-$ and 7^- isobaric analog resonances. $J^\pi=(13/2^+)$ in (n,n′γ). configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1974Cl07,1983Ma15). β_5=0.067 *4* from inelastic scattering (1967Al14).
3135.77 *7*	$(15/2)^{+}$[a]		d K Z	XREF: Others: AA, AC, AE, AH J^π: L(p,p′)=5, 394.72γ M1 to $15/2^+$ and 1527.13γ M1 to $13/2^+$. See also the 3133 level. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1983Ma15).
3152.83 *20*	$(9/2)^{+}$[a]		K Z	XREF: Others: AA, AC J^π: L(p,p′)=5, 3152.80γ E1 to $9/2^-$. configuration: probable a mixture of $\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ and $\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{4^-}$ (1974Cl07).
3154.06 *6*	$17/2^{+}$[a]		K Z	XREF: Others: AA, AC, AE J^π: L(p,p′)=5, 167.16γ M1 to $19/2^+$ and 413.04γ M1(+E2) to $15/2^+$, L(d,t)=1 from 9^-. configuration: probable a mixture of $\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ and $\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{4^-}$ (1974Cl07).
3159.33 *8*	$3/2^{(+)}$		K M Z	XREF: Others: AA J^π: 314.2γ (M1) to $1/2^+$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{4^-}$ (1983Ma15).
3169.07 *6*	$(13/2)^{+}$[a]		K Z	XREF: Others: AA, AC, AH J^π: L(p,p′)=5, 1560.49γ M1 to $13/2^+$. J=$(11/2^+)$ from (n,n′γ) (1996De48). configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{5^-}$ (1974Cl07,1983Ma15).
3197.60 *9*	$(1/2^+,3/2^+)$		D K M Z	J^π: 352.3γ (M1) to $1/2^+$ and 705.1γ to $3/2^+$.
3211.85 *6*	$(17/2)^{+}$[a]		K Z	XREF: Others: AA, AC, AE J^π: L(p,p′)=5, 225.05γ (M1) to $19/2^+$, L(d,t)=1 from 9^-. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}3p^{-1}_{1/2})_{4^-}$ (1983Ma15). Note, that $\pi(1h_{9/2})^{+1}\otimes5^-_1$ is

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)[†]	J^π	XREF	Comments
			proposed in 1974Cl07.
3221.65 *8*	$5/2^{+}$[b]	K Z	XREF: Others: AA J^π: 455.02 (M1) to $3/2^+$ and $\gamma(\theta)$ is not consistent with a J to J transition; 131.45γ to $7/2^+$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g_{9/2}^{+1}3p_{1/2}^{-1})_{4^-}$ (1974Cl07,1983Ma15).
3269.64 *11*	$1/2^+,3/2^+$	K M Z	J^π: 424.49γ (M1) to $1/2^+$.
3311.14 *6*	$(7/2^+,9/2^+)$	K Z	XREF: Others: AA, AC J^π: L(p,p′)=(3). 2414γ to $7/2^-$ and 3310γ to $9/2^-$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g_{9/2}^{+1}3p_{1/2}^{-1})_{4^-}$ (1974Cl07).
3354.8 *4*	$(5/2^+)$[b]	K Z	XREF: Others: AA J^π: from 588γ to $3/2^+$ in (t,2nγ), but $\gamma(\theta)$ is not consistent with a J to J transition.
3362.00 *11*	$(5/2^+,7/2^+,9/2^+)$	K Z	XREF: Others: AA J^π: 2465.7γ D to $7/2^-$. Note, that $J^\pi=(3/2^+)$ from (n,n′γ) (1996De48).
3378.16 *9*	$(9/2^+)$[b]	K Z	XREF: Others: AA, AC, AH J^π: 3378.11γ (E1) to $9/2^-$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g_{9/2}^{+1}3p_{1/2}^{-1})_{4^-}$ (1983Ma15).
3393.38 *21*	$(15/2^+)$[b]	K Z	XREF: Others: AA, AC J^π: 1784.8γ D to $13/2^+$. J=$(17/2^+)$ from (n,n′γ).
3395.00 *11*	$5/2^-,7/2,9/2,11/2^-$	d Z	XREF: Others: AA, AC J^π: 2498.7γ to $7/2^-$ and 3395.6γ to $9/2^-$.
3406.21 *9*	$13/2^{+}$[b]	D KL N Z	XREF: Others: AA, AC, AD, AE XREF: D(3400). J^π: L(α,t)=6, 1797.64γ M1 to $13/2^+$; $\gamma(\theta)$ is consistent with J to J transition. Note, that J=$(11/2^+)$ in (n,n′γ) (1996De48). configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g_{9/2}^{+1}3p_{1/2}^{-1})_{4^-}$ (1974Cl07,1983Ma15).
3449.7 *4*	$(7/2^+)$[b]	K M Z	XREF: Others: AA, AH J^π: 2553.4γ (E1) to $7/2^-$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g_{9/2}^{+1}3p_{1/2}^{-1})_{4^-}$ (1974Cl07,1983Ma15).
3464.12 *10*	$11/2^{+}$[b]	K Z	XREF: Others: AA, AC, AE J^π: L(d,t)=3 from 9^- for E=3469, L(p,p′)=5 for E=3466, 3464.09γ E1 to $9/2^-$; $\gamma(\theta)$ is not consistent with J to J transition. Note, that J=$(9/2)^+$ in (n,n′γ). configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g_{9/2}^{+1}3p_{1/2}^{-1})_{4^-}$ (1974Cl07,1983Ma15).
3467.67 *7*	$19/2^{+}$[b]	d K Z	XREF: Others: AA, AC, AE J^π: L(d,t)=3 from 9^- for E=3469, L(p,p′)=5 for E=3466. 480.87γ M1 to $19/2^+$, 313.70γ to $17/2^+$.
3486.93 *7*	$(19/2^+)$	d K Z	J^π: 500.12γ (M1) to $19/2^+$. probable configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(1i_{11/2}^{+1}3p_{1/2}^{-1})$ (1983Ma15).
3489.88 *20*	$(7/2,9/2)$	d K Z	J^π: 2593.6γ to $7/2^-$, 3490.1γ to $9/2^-$.
3502.23 *12*	$(15/2^+)$[b]	d K Z	XREF: Others: AA J^π: 290.38γ D to $17/2^+$. configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g_{9/2}^{+1}3p_{1/2}^{-1})_{4^-}$ (1974Cl07,1983Ma15).
3505.28 *20*	$5/2^-,7/2^-$	N Z	XREF: Others: AA J^π: L(α,t)=3 for E=3503 *15*.
3541.60 *21*	$(5/2^-,7/2,9/2)$	K Z	XREF: Others: AA

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	J^π	XREF	Comments
			J^π: 2545.3γ to 7/2$^-$, 3542.7γ to 9/2$^-$.
3575.08 *21*	(5/2,7/2$^+$)	d K Z	XREF: Others: AA J^π: 808γ to 3/2$^+$ and 2678.8γ to 7/2$^-$.
3579.00 *11*	(17/2$^+$ to 21/2$^+$)	d K	XREF: Others: AA J^π: L(p,p′)=5, 592.2γ D to 19/2$^+$. probable configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(1i^{+1}_{11/2}3p^{-1}_{1/2})$ (1983Ma15).
3590.50 *21*		M	
3597.14 *10*	19/2$^+$	K Z	XREF: Others: AA, AE J^π: L(p,p′)=5 and L(d,t)=1,3, 610.33γ M1 to 19/2$^+$; $\gamma(\theta)$ in (t,2nγ) is consistent with J to J transition. configuration=$\pi(1h_{9/2})^{+1}\otimes5^-_2$ or $\pi(1h_{9/2})^{+1}\otimes5^-_1$ (1974Cl07).
3601.72 *11*	(5/2$^+$,7/2$^+$,9/2$^+$)	K Z	XREF: Others: AA J^π: 2705γ (E1) to 7/2$^-$. probable configuration=$\pi(2f_{7/2})^{+1}\otimes3^-$ or $\pi(1h_{9/2})^{+1}\otimes5^-$ (1983Ma15).
3633.85 *8*	1/2$^-$	dE LMN P RS	XREF: Others: AA, AD, AF, AG XREF: N(3650)R(?). J^π: L(^{3}He,d)=L(α,t)=1, analyzing power fits in (pol ^{7}Li,^{6}He). configuration=$\pi(3p_{1/2})^{+1}$.
3684 *3*	17/2$^+$,19/2$^+$,21/2$^+$	d	XREF: Others: AA E(level): from (p,p′). J^π: L(p,p′)=5 from 9/2$^-$.
3692.14 *20*	(11/2$^-$)	D K n Z	XREF: Others: AA, AF XREF: D(?). J^π: suggested by 1972Ba81 in (t,α) on the basis of energy and strength as the $h_{11/2}$ hole state, 3692.14γ to 9/2$^-$. configuration=$\pi(1h_{11/2})^{-1}$ (1972Ba81). configuration: the authors of 1972Ba81 in (t,α) also propose a small component with configuration=$\pi(1h_{9/2})^{+1}\otimes3^-$.
3703.55 *20*	7/2$^{(+)}$	D K n Z	XREF: Others: AA XREF: D(?). E(level): two close levels at this energy are reported in (n,n′γ) (1996De48). However, no strong evidence supports two separate levels and the 664.8γ and 3703γ were placed from the same level in (t,2nγ) while assigned to the two separate levels in (n,n′γ). The evaluators treat them as the same level. J^π: 664.8γ D to 5/2$^+$ and 3703.4γ to 9/2$^-$; π=+ from probable configuration=$\pi(2f_{7/2})^{+1}\otimes3^-$ or $\pi(1h_{9/2})^{+1}\otimes5^-$. See (n,n′$\gamma$) dataset for J^π comments for the two separate levels at this level energy.
3717.64 *10*	(7/2$^+$,9/2$^+$,11/2$^+$)	K n Z	XREF: Others: AA J^π: from (t,2nγ). Note, that (5/2$^+$) in (n,n′γ).
3735 *5*	(15/2 to 21/2)$^+$		XREF: Others: AA, AE E(level): from (p,p′). J^π: L(d,t)=1,3 from 9$^-$ for 3735+3766. If L=3 for the 3766 component, as suggested by the observed g.s. transition from that level, then L=1 and thus J=15/2 to 21/2 for the 3735 level.
3752.2# *3*		Z	XREF: Others: AA, AE
3759.0 *5*		M	
3766.9# *3*	(11/2)$^+$	Z	XREF: Others: AA, AE J^π: L(d,t)=1,3 from 9$^-$ for 3735+3766. J is limited to 11/2 if

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	J^π	XREF	Comments
			the 3767γ in (n,n′γ) can be assigned as a transition to the ground state.
3772.60 *21*		M	
3783.08 *15*	(5/2,7/2,9/2)@	K M Z	J^π: 2886.78γ to $7/2^-$.
3800.85 *17*	$(7/2^+,9/2^+)$	d lM Z	XREF: Others: AA J^π: L(p,p′)=(3), 2904.8γ to $7/2^-$ and 3800.7γ to $9/2^-$.
3808.29 *21*		d lM	XREF: Others: AA
3812.25 *16*	$23/2^+$	K	XREF: Others: AA, AE J^π: L(d,t)=3 from 9^- for E=3818, 825.45γ E2 to $19/2^+$. probable configuration=$\pi(1h_{9/2})^{+1}\otimes\nu(2g^{+1}_{9/2}2f^{-1}_{5/2})$ (1983Ma15).
3816.70 *21*		M	J^π: 2920.4γ to $7/2^-$.
3817.86 *20*	$(11/2^+,13/2^+)$	D l Z	XREF: Others: AA, AE J^π: 2209.3γ to $13/2^+$ and 1253γ to $9/2^+$. L(d,t)=3 from 9^- for E=3818, if this corresponds in part to the 3817 level, would rule out J=9/2 and would require π=+.
3839 *4*	$11/2^+,13/2^+$	N R	XREF: Others: AA, AD, AH, AI XREF: R(3870). E(level): from (p,p′). J^π: L(α,t)=6 for E=3835 *15*.
3849.94 *20*		K Z	XREF: Others: AA
3884.3# *5*		Z	XREF: Others: AA
3889.5# *3*		Z	XREF: Others: AA
3905.9 *3*		Z	XREF: Others: AA
3912 *10*	$(15/2\ \text{to}\ 21/2)^+$		XREF: Others: AA, AE E(level): from (d,t). J^π: L(d,t)=1 from 9^-.
3913.26 *21*	$(1/2\ \text{to}\ 7/2^+)$	M	J^π: 1420.4γ to $3/2^+$.
3921.22 *10*	$(7/2^+,9/2^+)$	Z	XREF: Others: AA J^π: 3024.5γ γ to $7/2^-$ and 3921.2γ to $9/2^-$, L(p,p′)=(3).
3936.74# *10*	$(13/2^-)$	N Z	XREF: Others: AA J^π: L(α,t)>6. J is limited to 13/2 (and thus L=7) if the 3937γ in (n,n′γ) can be assigned as a ground-state transition.
3950 *5*	$(13/2^+\ \text{to}\ 17/2^+)$	l n	XREF: Others: AA, AE, AF E(level): from (p,p′). J^π: L(p,p′)=(3) from $9/2^-$.
3962.27 *22*	(7/2,9/2)	l Z	XREF: Others: AA, AE, AF J^π: 3066.1γ to $7/2^-$, 3962.1γ to $9/2^-$.
3980.04 *10*	$(11/2,13/2)^-$	Kl U Z	XREF: Others: AA, AF J^π: L(p,p′)=2, 3980γ to $9/2^-$. $g\Gamma^2_{\gamma 0}/\Gamma$=0.82 *8*. configuration=$\pi(1h_{9/2})^{+1}\otimes 2^+$ (1974Cl07).
4000.71 *15*	$9/2^+,11/2,13/2^-$@	n Z	XREF: Others: AA, AF J^π: 2391.8γ to $13/2^+$ and 4001γ to $9/2^-$.
4002 *10*	$(15/2\ \text{to}\ 23/2)^+$		XREF: Others: AA, AE, AF E(level): from (d,t). J^π: L(d,t)=1 from 9^-.
4009.3# *4*		n Z	XREF: Others: AA, AE, AF E(level): if the 4009γ is incorrectly assigned as a transition to the ground state, then the only evidence for a level at this energy is a (p,p′) level at 4013 *5*. This level might be the same as the (d,t) level at 4002 *10*.
4021 *10*		n	XREF: Others: AE, AF

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)[†]	J$^\pi$	XREF	Comments
			E(level): from (d,t). J$^\pi$: L(α,t)>6 for 4019 *25*.
4036.5[#] *4*		Z	XREF: Others: AA
4046.54[#] *20*		Z	XREF: Others: AA
4065[e] *10*			XREF: Others: AE E(level): from (d,t).
4079[e] *7*			XREF: Others: AA, AE E(level): from (p,p′).
4088.34 *10*	(5/2 to 13/2)$^-$	l U Z	XREF: Others: AA, AC, AE, AF XREF: AA(4092). J$^\pi$: L(p,p′)=2 from 9/2$^-$. g$\Gamma^2_{\gamma 0}/\Gamma$=0.28 *3*.
4091.4 *4*	(1/2$^-$,3/2$^-$)	lM	XREF: Others: AE, AF J$^\pi$: 1648.5γ to 1/2$^+$, π=− from probable configuration. configuration=$\pi(1h_{9/2})^{+1}\otimes 2^+$ or $\pi(2f_{5/2})^{+1}$ (1974Cl07).
4096.34 *17*	(9/2$^+$,11/2,13/2$^-$)	l Z	XREF: Others: AA, AB, AE, AF XREF: AA(4101). J$^\pi$: 2488.2γ to 13/2$^+$ and 4096.1γ to 9/2$^-$.
4096.59 *22*	(1/2 to 7/2$^-$)	lM	XREF: Others: AF J$^\pi$: 977.1γ to 3/2$^-$.
4116 *4*	($^+$)		XREF: Others: AA, AE, AF J$^\pi$: L(p,p′)=(7) from 9/2$^-$. E(level): from (p,p′).
4123 *7*			XREF: Others: AA, AE, AF E(level): from (p,p′).
4134.0[#] *20*		D Z	XREF: Others: AA, AF
4141.95 *10*	21/2$^{(+)}$	K	XREF: Others: AA J$^\pi$: 544.85γ and 654.98γ D to J=19/2; π from probable configuration=$\pi(2f_{7/2})^{+1}\otimes 3^-$ or $\pi(1h_{9/2})^{+1}\otimes 5^-$ (1983Ma15).
4148.11 *14*	(9/2$^+$,11/2$^-$)	l U Z	XREF: Others: AF J$^\pi$: 2539.6γ to 13/2$^+$ and 3251.6γ to 7/2$^-$. g$\Gamma^2_{\gamma 0}/\Gamma$=0.07 *2*.
4158.79 *19*	$^-$	l U Z	XREF: Others: AA, AB, AE, AF, AH XREF: AA(4157). J$^\pi$: L(p,p′)=2, 3262.8γ to 7/2$^-$ and 4158.7γ to 9/2$^-$. g$\Gamma^2_{\gamma 0}/\Gamma$=0.21 *4*.
4160.9[#] *7*	(13/2$^-$)	l n Z	XREF: Others: AA, AB, AC, AE, AG XREF: AA(4162). J$^\pi$: L(p,p′)=(2), J$^\pi$=13/2$^-$, 15/2$^-$ for E=4174 *25* from L(α,t)=7. γ to 9/2$^-$ rules out the 15/2$^-$ alternative if the (α,t) peak corresponds to the 4161 level. configuration=$\pi(1h_{9/2})^{+1}\otimes 2^+$ (1974Cl07).
4168 *7*	(11/2$^-$ to 15/2$^-$)	d l n	XREF: Others: AA E(level): from (p,p′). J$^\pi$: L(p,p′)=(2); high spins are suggested in (α,d).
4176.14 *10*	(7/2,9/2,11/2)$^+$	d l U Z	XREF: Others: AA J$^\pi$: 4176.1γ to 9/2$^-$, L(p,p′)=3. g$\Gamma^2_{\gamma 0}/\Gamma$=0.21 *4*.
4207.5 *4*		U Z	XREF: Others: AA, AB, AC, AE XREF: AA(4210). J$^\pi$: L(p,p′)=2 (1974Cl07), L(p,p′)=3 (1975Wa03). g$\Gamma^2_{\gamma 0}/\Gamma$=0.25 *3*. configuration=$\pi(1h_{9/2})^{+1}\otimes 2^+$ (1974Cl07).

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	J$^\pi$	XREF	Comments
4222.9# *7*		l n U Z	XREF: Others: AA, AC, AE, AF, AH XREF: AH(4220).
4225 *10*	(15/2 to 21/2)$^+$	l	XREF: Others: AA, AE, AF E(level): from (d,t). J$^\pi$: L(d,t)=1 from 9$^-$.
4233.75# *20*	(13/2)$^-$	l n U Z	XREF: Others: AA, AF J$^\pi$: L(α,t)=7. J is limited to 13/2 if the 4233γ in (n,n′γ) can be interpreted as a ground-state transition corresponding to the (α,t) level; otherwise, J^π=13/2$^-$,15/2$^-$ for E=4247 *25*.
4236.9 *3*		lM	XREF: Others: AA, AF
4257 *4*	(15/2 to 21/2)$^+$		XREF: Others: AA, AE E(level): from (p,p′). J$^\pi$: L(d,t)=1 from 9$^-$.
4262.95 *20*		Z	XREF: Others: AA
4286 *3*	15/2$^-$,17/2$^-$,19/2$^-$	D R	XREF: Others: AA, AC, AE, AG, AH XREF: D(4276)R(4270). E(level): from (p,p′). J$^\pi$: L(p,p′)=4 from 9/2$^-$.
4297.73 *17*		Z	XREF: Others: AA, AC, AE XREF: AA(4294).
4300.75# *10*	($^+$)	Z	XREF: Others: AA J$^\pi$: L(p,p′)≈7.
4313? *7*			XREF: Others: AA E(level): from (p,p′).
4326 *3*		D	XREF: Others: AA E(level): from (p,p′).
4335.3 *3*		Z	XREF: Others: AA
4340.7# *5*		Z	XREF: Others: AA
4349 *7*	(15/2 to 21/2)$^+$		XREF: Others: AA, AE E(level): from (p,p′). J$^\pi$: L(d,t)=1 from 9$^-$.
4361.89 *21*	(11/2,13/2,15/2)$^-$	Z	XREF: Others: AA J$^\pi$: L(p,p′)=4, 2753.3γ to 13/2$^+$.
4376.5# *6*		Z	XREF: Others: AA
4381.31 *21*		Z	XREF: Others: AA
4388.15 *19*		d p Z	XREF: Others: AA J$^\pi$: 3491.9γ to 7/2$^-$ and 4387.7γ to 9/2$^-$.
4397.85# *20*		d p Z	XREF: Others: AA
4409.05# *20*		d Z	XREF: Others: AA J$^\pi$: L(p,p′)≈8 from 9/2$^-$.
4415.33 *16*	1/2$^-$	E LMN	XREF: Others: AA, AB, AC, AE, AF XREF: L(4421)N(4459). J$^\pi$: 1295.9γ to 3/2$^-$ and 1922.4γ to 3/2$^+$, L(^{3}He,d)=(1), $p_{1/2}$ state suggested in (p,γ) and in (^{3}He,d), L(α,t)=1+3 for E=4459 *25*. configuration=$\pi(3p_{1/2})^{+1}$ (1970El13).
4417 *10*	(15/2 to 21/2)$^+$		XREF: Others: AE E(level): from (d,t). J$^\pi$: L(d,t)=1 from 9$^-$.
4426.7 *3*		M	
4441.7# *10*	(7/2)$^-$	lMn Z	XREF: Others: AA configuration=$\pi(2f_{7/2})^{+1}$ (1970El13). J$^\pi$: L(p,p′)=4, L(^{3}He,d)=(2,3), L(α,t)=1+3 for E=4459 *25*. 4439.1γ to 9/2$^-$. Possible $f_{7/2}$ state suggested in (^{3}He,d).

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)[†]	J^π	XREF	Comments
4471.0 *3*	$(9/2^+,11/2,13/2^-)$	d Z	XREF: Others: AA, AE, AG XREF: AA(4469). J^π: 2862.5γ to $13/2^+$ and 4470.5γ to $9/2^-$.
4478.2 *3*		d M	
4484.79 *11*		d Z	XREF: Others: AA
4506.85 *20*		d U Z	
4515.23 *10*	$(9/2^+,11/2,13/2^-)$	d Z	XREF: Others: AA J^π: 2906.6γ to $13/2^+$ and 4515.3γ to $9/2^-$.
4516.5 *3*		d M	XREF: Others: AA
4522 *10*		d L	E(level): from (^{3}He,d). L(^{3}He,d)=low suggests that this level is distinct from that at 4515 or at 4532.
4532 *4*	$(13/2^-,15/2^-)$	N	XREF: Others: AA, AD, AE, AF XREF: N(4543). E(level): from (p,p′). J^π: L(p,p′)≈8, L(α,t)=(7) for E=4543 *25*.
4588.3 *3*		M Z	XREF: Others: AA, AC, AE, AF XREF: AA(4592).
4602.6[#] *13*	$(5/2^-,7/2,9/2^+)$	D L Z	J^π: L(^{3}He,d)=low for 4600 *10*, assuming L<5. 4602.5γ to $9/2^-$.
4613 *5*	$5/2^-,7/2^-$	N	XREF: Others: AA E(level): from (p,p′). J^π: L(α,t)=3 for E=4613 *25*.
4646.1[#] *3*		Z	
4682.0 *8*		n Z	XREF: Others: AA
4700 *25*		n	XREF: Others: AA E(level): one or both of the transitions with energy 4691.5 *3* and 4702.3 *4* reported in (n,n′γ) could be ground-state transitions corresponding to the peak at 4700 seen in (α,t) and (p,p′).
4739.62 *21*		d M	
4750.79 *17*		d Z	
4755.76 *20*	(7/2,9/2,11/2)[d]	d U Z	XREF: Others: AA J^π: 4755.7γ (D) to $9/2^-$. $g\Gamma^2_{\gamma0}/\Gamma$=2.8 *4*.
4762.3 *3*		Z	XREF: Others: AA
4786.32 *21*		M	XREF: Others: AA
4789.8 *4*	$(9/2^+,11/2,13/2^-)$	n Z	XREF: Others: AA J^π: 3181.1γ to $13/2^+$ and 4790γ to $9/2^-$. L(α,t)=6 for E=4795 *25*. See also 4796.1 level.
4796.1 *3*	(7/2,9/2,11/2)[d]	n U Z	XREF: Others: AA J^π: 4796.0γ (D) to $9/2^-$, L(α,t)=6 for E=4795 *25*. See also 4789.8 level. $g\Gamma^2_{\gamma0}/\Gamma$=2.9 *5*.
4830.3 *3*	(7/2,9/2,11/2)[d]	U Z	XREF: Others: AA J^π: 4830.2γ (D) to $9/2^-$. $g\Gamma^2_{\gamma0}/\Gamma$=1.4 *2*.
4837.6 *3*		Z	
4853.46[#] *20*		Z	XREF: Others: AA
4879.47 *19*		Z	XREF: Others: AF
4886 *25*	$13/2^-,15/2^-$	N	XREF: Others: AF E(level): from (α,t). J^π: L(α,t)=7.
4904.2 *3*		D M	
4948.3 *5*		Z	XREF: Others: AA

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	J$^{\pi}$	XREF	Comments
4967.6# *15*		Z	XREF: Others: AA
4996.2 *3*	(13/2)$^-$	N R Z	XREF: Others: AA J$^{\pi}$: L(α,t)=7, J is limited to 13/2 if the 4996γ in (n,n$'\gamma$) can be interpreted as a ground-state transition corresponding to the (α,t) level; otherwise, J^{π}=13/2$^-$,15/2$^-$ for E=4998 *25*.
5054.0 *4*		M	XREF: Others: AA
5056.7# *6*	(11/2)$^+$	Z	XREF: Others: AA, AE J$^{\pi}$: L(d,t)=3 from 9$^-$, J is then limited to 11/2 if the 5057γ in (n,n$'\gamma$) can be interpreted as a ground-state transition corresponding to the (d,t) level; otherwise J^{π}=11/2$^+$ to 25/2$^+$ for E=5058 *10*.
5087 *25*	5/2$^-$,7/2$^-$	N	E(level): one or both of the transitions with energy 5074.9 and 5096.6 reported in (n,n$'\gamma$) could be ground-state transitions corresponding to the peak at 5087 seen in (α,t). J$^{\pi}$: L(α,t)=3.
5131 *6*			XREF: Others: AA E(level): from (p,p$'$). J$^{\pi}$: L(p,p$'$)≈7.
5152.2 *3*		M	
5167.3 *3*	(9/2$^+$,11/2,13/2$^-$)	Z	J$^{\pi}$: 3558.5γ to 13/2$^+$ and 5167.6γ to 13/2$^+$.
5182.7 *7*	5/2$^-$,7/2$^-$	N U Z	XREF: Others: AB, AD, AF, AH XREF: N(5173)U(?). J$^{\pi}$: L(α,t)=3 for E=5173 *25*. g$\Gamma^2_{\gamma0}/\Gamma$=0.9 *3*.
5190.7 *4*		M	
5235.1 *3*	(7/2,9/2,11/2)^d	U Z	XREF: Others: AA, AB, AC, AE, AF XREF: AA(5241). J$^{\pi}$: 5235.0γ (D) to 9/2$^-$. g$\Gamma^2_{\gamma0}/\Gamma$=1.4 *3*.
5256 *10*	+		XREF: Others: AE E(level): from (d,t). J$^{\pi}$: L(d,t)=3 from 9$^-$.
5277 *25*	13/2$^-$,15/2$^-$	i N	E(level): from (α,t). J$^{\pi}$: L(α,t)=7.
5281.9 *11*	(7/2,9/2,11/2)^d	i U Z	XREF: Others: AA J$^{\pi}$: 5281.8γ (D) to 9/2$^-$. g$\Gamma^2_{\gamma0}/\Gamma$=5.5 *11*.
5292.7 *4*		i M	
5293.4 *6*	(7/2,9/2,11/2)^d	i l U Z	J$^{\pi}$: 5293.3γ (D) to 9/2$^-$. g$\Gamma^2_{\gamma0}/\Gamma$=2.2 *6*.
5312.6 *13*	(7/2,9/2,11/2)^d	i l U Z	XREF: Others: AA J$^{\pi}$: 5312.5γ (D) to 9/2$^-$. g$\Gamma^2_{\gamma0}/\Gamma$=3.0 *9*.
5333 *5*			XREF: Others: AA E(level): from (p,p$'$).
5354.0 *4*	(7/2,9/2,11/2)^d	U Z	XREF: Others: AA J$^{\pi}$: 5353.9γ (D) to 9/2$^-$. g$\Gamma^2_{\gamma0}/\Gamma$=3.0 *9*.
5367 *10*	+		XREF: Others: AA, AE E(level): one or both of the transitions with energy 5361.6 *12* and 5371.9 *7* reported in (n,n$'\gamma$) could be ground-state transitions corresponding to the peak at 5367 seen in (d,t). J$^{\pi}$: L(d,t)=3 from 9$^-$.
5369.8 *4*	(1/2,3/2,5/2$^+$)	M	J$^{\pi}$: 2926.9γ to 1/2$^+$.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	J$^{\pi}$	T$_{1/2}$	XREF	Comments
5380 *25*	13/2$^-$,15/2$^-$		N	E(level): several transitions in (n,n′γ) could correspond to ground-state transitions from the peak at 5380 *25* reported in (α,t). J$^{\pi}$: L(α,t)=7.
5404.5# *6*	(11/2)$^+$		Z	XREF: Others: AE J$^{\pi}$: L(d,t)=3 from 9$^-$, J is limited to 11/2 if the 5404.5γ in (n,n′γ) can be interpreted as a ground-state transition corresponding to the (d,t) level; otherwise J^{π}=11/2$^+$ to 25/2$^+$ for E=5402 *10*.
5411.2 *6*			U Z	E(level): unresolved multiplet in (γ,γ′) with g$\Gamma(\gamma_0)^2/\Gamma$=3.3 *8* (1980Ch22).
5424.62 *24*	(9/2$^+$,11/2)		U Z	XREF: Others: AA J$^{\pi}$: 3815.9γ to 13/2$^+$ and 5424.6γ to 9/2$^-$; excitation in (γ,γ′). g$\Gamma^2_{\gamma0}/\Gamma$=1.7 *5*.
5440.2 *10*	(7/2,9/2,11/2)		r U Z	J$^{\pi}$: 5440.1γ to 9/2$^-$; excitation in (γ,γ′). g$\Gamma^2_{\gamma0}/\Gamma$=1.6 *5*.
5464.6 *8*	11/2$^+$	0.39 fs *11*	N r U Z	XREF: Others: AA, AE J$^{\pi}$: L(α,t)=6 for E=5469 *25*, L(d,t)=3 for E=5464 *10*. 5464.5γ to 9/2$^-$. T$_{1/2}$: deduced by evaluators from g$\Gamma(\gamma_0)^2/\Gamma$=1.4 eV *4* in ($\gamma$,$\gamma$′).
5484.4 *5*	(7/2,9/2,11/2)^d		U Z	J$^{\pi}$: 5484.3γ (D) to 9/2$^-$. g$\Gamma^2_{\gamma0}/\Gamma$=4.0 *8*.
5498.0 *10*	(7/2,9/2,11/2)^d		U Z	J$^{\pi}$: 5497.9γ (D) to 9/2$^-$. g$\Gamma^2_{\gamma0}/\Gamma$=4.8 *9*.
5510.53 *24*	(9/2$^+$,11/2,13/2$^-$)		U Z	XREF: Others: AA E(level): unresolved multiplet in (γ,γ′) with g$\Gamma(\gamma_0)^2/\Gamma$=6.8 *12*. J$^{\pi}$: 3902$\gamma$ to 13/2$^+$ and 5510.4γ to 9/2$^-$.
5523.5 *5*			Z	
5538.4 *7*	(7/2,9/2,11/2)		U Z	E(level): unresolved multiplet in (γ,γ′) with g$\Gamma(\gamma_0)^2/\Gamma$=4.4 *10*. J$^{\pi}$: 4641.8$\gamma$ to 7/2$^-$ and 5538.4γ to 9/2$^-$; excitation in (γ,γ′).
5559.6 *6*	(7/2,9/2,11/2)		n U Z	XREF: Others: AA E(level): 5554 *2* is reported in (γ,γ′). The evaluator assumes that this is the same level as that reported in (n,n′γ). J$^{\pi}$: 4663γ to 7/2$^-$ and 5559.8γ to 9/2$^-$; excitation in (γ,γ′). g$\Gamma^2_{\gamma0}/\Gamma$=2.6 *8*.
5563.4 *6*			M	XREF: Others: AA
5570.6 *7*	(11/2$^+$)	0.32 fs *19*	n U Z	XREF: Others: AA J$^{\pi}$: 5570.5γ to 9/2$^-$, L(α,t)=6 for E=5580 *25*. T$_{1/2}$: deduced by evaluators from g$\Gamma(\gamma_0)^2/\Gamma$=1.7 eV 10 in ($\gamma$,$\gamma$′).
5589.2 *7*	(11/2$^+$)	0.17 fs *5*	n U Z	J$^{\pi}$: 5589.1γ to 9/2$^-$, L(α,t)=6 for E=5580 *25*. T$_{1/2}$: deduced by evaluators from g$\Gamma(\gamma_0)^2/\Gamma$=3.2 eV *9* in ($\gamma$,$\gamma$′).
5609 *5*	11/2$^-$	0.48 fs *10*	U	J$^{\pi}$: 5609γ M1 to 9/2$^-$ and $\gamma(\theta)$, γ(pol) in (γ,γ′). T$_{1/2}$: deduced by evaluators from Γ=0.95 eV *20* in (γ,γ′) (1974Te01).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	Jπ	$T_{1/2}$	XREF	Comments
5609.8 *3*			Z	
5652.6# *8*	(11/2)+		Z	XREF: Others: AE Jπ: L(d,t)=3 from 9−, J is limited to 11/2 if the 5652.5γ in (n,n′γ) can be interpreted as a ground-state transition corresponding to the (d,t) level; otherwise, Jπ=11/2+ to 25/2+ for E=5657 *10*.
5662.1 *20*	(7/2,9/2,11/2)		U	Jπ: 5662γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=1.6 *4*.
5668.3 *3*			M	
5693 *25*	(3/2+,5/2+)		N	E(level): from (α,t). Jπ: L(α,t)=(2).
5769 *5*				XREF: Others: AA E(level): from (p,p′).
5788.7 *4*			M	
5795 *7*				XREF: Others: AA E(level): probable multiplet from (p,p′).
5835 *8*				XREF: Others: AA E(level): probable multiplet from (p,p′).
5925.1 *17*	(11/2)+		Z	XREF: Others: AE Jπ: L(d,t)=3 from 9−. J is limited to 11/2 if the 5925.1γ in (n,n′γ) can be interpreted as a ground-state transition corresponding to the (d,t) level; otherwise Jπ=11/2+ to 25/2+ for E=5924 *10*.
6301.1 *4*			M	
6382.0 *6*			M	
6392 *8*			U	
6556.1 *10*			U	
6712.2 *4*			M	
6900.5 *7*			M	
6911? *4*	(7/2,9/2,11/2)		U	Jπ: 6911γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=2.4 *5*.
6944.8 *21*	(7/2,9/2,11/2)		U Z	XREF: U(?). Jπ: 6944.7γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=2.1 *6*.
6983 *4*	(7/2,9/2,11/2)		U	Jπ: 6983γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=2.6 *5*.
7106? *4*	(7/2,9/2,11/2)		U	Jπ: 7106γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=1.0 *3*.
7168.1 *10*	9/2+	0.56 fs *3*	L U	XREF: Others: AB, AD, AF, AH XREF: L(7153). Jπ: 7168γ E1 to 9/2− and γ(θ), γ(pol) in (γ,γ′). $T_{1/2}$: deduced by evaluators from Γ=0.82 eV *4* in (γ,γ′) (1972Wo21).
7171 *4*	(7/2,9/2,11/2)		U	Jπ: 7171γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=4.7 *10*.
7176.6 *10*	(7/2,9/2,11/2)		U Z	XREF: U(?). Jπ: 7176.5γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=24 *5*.
7202 *5*	11/2+,13/2+		N U	XREF: Others: AA, AC, AH XREF: N(7200). Jπ: L(α,t)=6; 7202γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=30 *5*.
7243.9 *13*	(7/2,9/2,11/2)		U Z	Jπ: 7243.8γ to 9/2−; excitation in (γ,γ′). $g\Gamma^2_{\gamma 0}/\Gamma$=3.7 *8*.
7264 *4*	(7/2,9/2,11/2)		U	$g\Gamma^2_{\gamma 0}/\Gamma$=2.4 *9*.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	J^π	$T_{1/2}$	XREF	Comments
				J^π: 7264γ to 9/2$^-$; excitation in (γ,γ′).
7279.1 *10*			U	
7279+x			U	Additional information 2. E(level): x≈200 eV. See (γ,γ′).
7287 *4*	(7/2,9/2,11/2)		U	J^π: 7287γ to 9/2$^-$; excitation in (γ,γ′). $g\Gamma^2_{\gamma0}/\Gamma$=2.6 *7*.
7360 *4*	(7/2,9/2,11/2)		U	J^π: 7360γ to 9/2$^-$; excitation in (γ,γ′). $g\Gamma^2_{\gamma0}/\Gamma$=4.3 *11*.
7416.1 *10*	9/2$^-$	1.9 fs *+46−12*	U	J^π: from 7416γ(θ) (D) to 9/2$^-$ and γ,γ(pol) in (γ,γ′). $T_{1/2}$: deduced by evaluators from Γ=0.24 eV *+38−17* in (γ,γ′).
7632.1 *10*	(9/2$^+$)	<0.9 fs	UV	J^π: from L(γ,n)=0 to 5$^+$ and 4$^+$; 7632γ(θ) (D) to 9/2$^-$. $T_{1/2}$: deduced by evaluators from Γ>0.5 eV in (γ,γ′).
8400			P	Γ=4 MeV E(level): from (^{7}Li,^{6}He).
8.7×10^3 *5*			N	E(level): from (α,t). J^π: L(α,t)=(6+7).
9000				XREF: Others: AB E(level): from (p,p′) giant resonance. L=(2). %EWSR(E2)=9.
10.3×10^3 *5*			L	
10.9×10^3 *3*			Y	XREF: Others: AB, AD Γ=2.7 MeV *3* E(level),Γ: from (α,α′) giant resonance. Others: E=10.9 MeV, Γ=2.7 MeV from (e,n) giant resonance; E=10.7 MeV, Γ=2.2 MeV from (p,p′) giant resonance. %EWSR(E2)=50 *30* from (e,n); 90-150 for L=2, or 50-150 for L=2 with 20-40% for L=4 from (α,α′).
13450 *10*			U Y	XREF: Others: AD Γ=3.89 MeV *3* E(level),Γ: from (e,n) giant resonance. Other: (γ,γ′), (α,α′): giant resonance. %EWSR=80-120 for L=0 and 30-50 for L=2 with the maximum contribution from L=4 giving %EWSR=15-30 ((α,α′): giant resonance).
18627‡ *4*	9/2$^+$ c		GH W	
19382‡ *26*	(11/2$^+$) c		GH W	
20.10×10^3‡ *15*	(15/2$^+$) c		H	
20186‡ *4*	5/2$^+$ c		GH	
20671‡ *6*	(1/2$^+$) c		H	
21114‡ *16*	7/2$^+$ c		GH	
21172‡ *18*	3/2$^+$ c		H	
≈22000			F XY	E(level): reported values are 20.2 MeV with Γ=6 MeV in (e,n), ≈20 MeV with Γ=8 MeV in (e,e′), and ≈23 MeV with Γ≈3.5 MeV in (p,γ) giant resonance.

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Adopted Levels, Gammas (continued)

^{209}Bi Levels (continued)

E(level)†	Jπ	$T_{1/2}$	XREF	Comments
				%EWSR(E2)=200 *90* determined in (e,n). E2 or E0 excitation suggested in (e,e′), but observation in (p,γ) rules out E0. Possible isovector E2 giant resonance.

† From a least-squares fit to γ-ray energies, unless otherwise noted.
‡ IAR from ^{208}Pb(p,p′),(pol p,p′). See the IAR source data sets for information on widths.
# From Eγ to ground state in (n,n′γ). The placement of the authors is based on the agreement in energy with a previously-known level. Since only a single transition is observed, the existence of the (n,n′γ) level is not definitely established.
@ From 1996De48 in (n,n′γ), based on comparisons of the measured γ-yields with the theoretical predictions based on the statistical model of the compound nucleus.
& L(p,p′)=3, σ(p,p′). See comment “particle-vibration coupled states (^{208}Pb 3^-)”.
[a] L(p,p′)=5. See comment “particle-vibration coupled states (^{208}Pb 4^-, 5^-)”.
[b] See comment “particle-vibration coupled states (^{208}Pb 4^-,5^-).
[c] from ^{208}Pb(p,pol p), analog resonance to the levels in ^{209}Pb.
[d] Excitation in (γ,γ′) is probably D (or D+Q). The measured values of $g\Gamma(\gamma_0)^2/\Gamma$ lead to B(E2)(W.u.)>10. Values this large are not expected for the probable configurations involved.
[e] L(d,t)=1 from 9^- for 4065+4084+4122 peak.

Adopted Levels, Gammas (continued)

$\gamma(^{209}Bi)$

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	δ[e]	α[d]	Comments
896.28	7/2$^-$	896.28[‡] *7*	100[‡]	0.0	9/2$^-$	M1+E2	−0.62 *6*	0.0208 *8*	α(K)=0.0170 *6*; α(L)=0.00293 *9*; α(M)=0.000687 *21* α(N)=0.000176 *6*; α(O)=3.58×10^{-5} *11*; α(P)=4.23×10^{-6} *14* B(M1)(W.u.)=0.0026 *5*; B(E2)(W.u.)=0.44 *9* Mult.,δ: from α(K)exp=0.0170 *5* in ^{209}Po ε decay. Sign is from $\gamma(\theta)$ in Coulomb excitation. Other: δ=−0.95 *25* from Coulomb excitation (1973Kr02).
1608.57	13/2$^+$	1608.53[‡] *8*	100[‡]	0.0	9/2$^-$	M2+E3	+0.33 *10*	0.0127 *5*	α(K)=0.0103 *4*; α(L)=0.00182 *7*; α(M)=0.000431 *15* α(N)=0.000110 *4*; α(O)=2.25×10^{-5} *8*; α(P)=2.67×10^{-6} *10*; α(IPF)=6.36×10^{-5} *13* B(M2)(W.u.)=0.32 *18*; B(E3)(W.u.)=7 *6* Mult.: A2=+0.47 *2* (1978Be17) in (^{7}Li,α2nγ) and A2=+0.42 *1* (1983Ma15) in (t,2nγ). δ: from $\gamma(\theta)$ in (^{7}Li,α2nγ) (1978Be17).
2442.92	1/2$^+$	1546.52 *9*	100	896.28	7/2$^-$	E3		0.00639	B(E3)(W.u.)=1.95 *7* α(K)=0.00499 *7*; α(L)=0.001032 *15*; α(M)=0.000248 *4* α(N)=6.34×10^{-5} *9*; α(O)=1.276×10^{-5} *18*; α(P)=1.437×10^{-6} *21*; α(IPF)=3.68×10^{-5} *6* E_γ: weighted average of 1546.47 *5* in (t,2nγ), 1546.7 *1* in (n,n′γ) and 1546.2 *5* in (d,nγ). Mult.: α(K)exp=0.0054 *14* in (d,nγ) (1978El07), $\gamma(\theta)$ is isotropic from (t,2nγ) (1983Ma15).
2492.86	3/2$^+$	(49.94 *7*)	≈1.6	2442.92	1/2$^+$	[M1]		14.51	α(L)=11.08 *17*; α(M)=2.61 *4* α(N)=0.668 *10*; α(O)=0.1364 *20*; α(P)=0.01623 *24* B(M1)(W.u.)≈0.073 E_γ,I_γ: from (t,2nγ) (1983Ma15). Transition not seen directly. Energy from level energy difference and total intensity inferred from $\gamma\gamma$ to be ≈20% of the branching from the 2493 level. Mult.: from J^π difference and RUL. B(E2)(W.u.)(49.94γ) would be 710 if mult were pure E2. This is an unreasonably large value for this mass region.
		2492.86[‡] *11*	100[‡]	0.0	9/2$^-$	[E3]		0.00275	B(E3)(W.u.)≈20 α(K)=0.00197 *3*; α(L)=0.000347 *5*; α(M)=8.17×10^{-5} *12* α(N)=2.09×10^{-5} *3*; α(O)=4.24×10^{-6} *6*; α(P)=4.96×10^{-7} *7*; α(IPF)=0.000325 *5*
2564.14	(9/2)$^+$	2564.12[‡] *10*	100[‡]	0.0	9/2$^-$	E1+E3	0.026 *3*	1.43×10^{-3}	α(K)=0.000449 *7*; α(L)=6.65×10^{-5} *10*; α(M)=1.531×10^{-5} *22* α(N)=3.90×10^{-6} *6*; α(O)=7.98×10^{-7} *12*; α(P)=9.57×10^{-8} *14*; α(IPF)=0.000897 *13* B(E1)(W.u.)=0.00076 *16*; B(E3)(W.u.)=29 *9* Mult.: A_2=+0.25 *3* (1983Ma15) in (t,2nγ). δ: From the Adopted half-life of 0.015 ps *3* and B(E3)=0.073 *11*,

γ(^{209}Bi) (continued)

E_i(level)	J^π_i	E_γ [†]	I_γ [†]	E_f	J^π_f	Mult. [b]	δ [e]	α [d]	Comments
2583.02	(7/2)$^+$	1686.66[‡] *10*	100[‡] *2*	896.28	7/2$^-$	E1		1.36×10^{-3}	α(K)=0.000885 *13*; α(L)=0.0001327 *19*; α(M)=3.06×10^{-5} *5* α(N)=7.80×10^{-6} *11*; α(O)=1.591×10^{-6} *23*; α(P)=1.90×10^{-7} *3*; α(IPF)=0.000300 *5* B(E1)(W.u.)=9.E−5 *3* Mult.: from $\gamma(\theta)$ from (t,2nγ), A_2=+0.08 *2* (1983Ma15).
		2583.07[‡] *10*	46[‡] *2*	0.0	9/2$^-$	E1+E3	0.19 *3*	1.48×10^{-3} *3*	α(K)=0.000492 *18*; α(L)=7.4×10^{-5} *3*; α(M)=1.72×10^{-5} *8* α(N)=4.38×10^{-6} *19*; α(O)=9.0×10^{-7} *4*; α(P)=1.07×10^{-7} *5*; α(IPF)=0.000890 *14* B(E1)(W.u.)=1.1×10^{-5} *4*; B(E3)(W.u.)=22 *10* I_γ: In (n,n′γ), the 30 *1* from 1984Pr08 appears to be an outlier and in weighted average, 46.8 *18* from 2008Mi01 in (n,n′γ) is used. Mult.,δ: A_2=+0.20 *5* (1983Ma15) in (t,2nγ). δ: From the Adopted half-life of 0.31 ps *10* and B(E3)=0.067 *4*, weighted average of 0.065 *10* from Coulomb excitation (1969He07) and 0.067 *4* (1968Zi02). Note, that B(E3)=0.67 *4* is quoted in 1968Zi02, which is a typo.
2599.91	11/2$^+$	992.0 *5*	17.6 *24*	1608.57	13/2$^+$	[M1]		0.0196	α(K)=0.01611 *23*; α(L)=0.00269 *4*; α(M)=0.000629 *9* α(N)=0.0001609 *23*; α(O)=3.29×10^{-5} *5*; α(P)=3.94×10^{-6} *6* B(M1)(W.u.)=0.09 *3* E_γ,I_γ: from Coulomb excitation (1969He07).
		2599.9[‡] *1*	100[‡] *2*	0.0	9/2$^-$	E1+E3	0.051 *8*	1.45×10^{-3}	α(K)=0.000442 *7*; α(L)=6.55×10^{-5} *10*; α(M)=1.508×10^{-5} *22* α(N)=3.84×10^{-6} *6*; α(O)=7.86×10^{-7} *12*; α(P)=9.43×10^{-8} *14*; α(IPF)=0.000918 *13* B(E1)(W.u.)=0.00026 *8*; B(E3)(W.u.)=36 *15* Mult.: (D) from $\gamma(\theta)$ in (t,2nγ). δ: from the adopted $T_{1/2}$ of 36 fs *10* and B(E3)=0.078 *12* from Coulomb excitation (1969He07).
2600.92	13/2$^+$	992.35[‡] *2*	100[‡] *1*	1608.57	13/2$^+$	M1(+E2)	−0.04 *4*	0.0196	α(K)=0.01608 *23*; α(L)=0.00269 *4*; α(M)=0.000628 *9* α(N)=0.0001606 *23*; α(O)=3.28×10^{-5} *5*; α(P)=3.93×10^{-6} *6* B(M1)(W.u.)=(0.050 *16*); B(E2)(W.u.)=(0.03 *+6−3*) Mult.: A_2=+0.27 *4* in (^{7}Li,α2nγ) (1978Be17), A_2=+0.27 *2* in (t,2nγ) (1983Ma15). δ: from 1978Be17 in (^{7}Li,α2nγ) based on a comparison of the experimental B(E2) for each δ solution with the value from a weak-coupling calculation.

$\gamma(^{209}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	δ[e]	α[d]	Comments
2600.92	13/2+	2600.6 *5*	1.3 *5*	0.0	9/2−	(M2+E3)	>0.9	0.0031 *6*	α(K)=0.0022 *5*; α(L)=0.00038 *7*; α(M)=9.0×10−5 *16* α(N)=2.3×10−5 *4*; α(O)=4.7×10−6 *9*; α(P)=5.6×10−7 *11*; α(IPF)=0.00040 *4* B(M2)(W.u.)<0.18?; B(E3)(W.u.)>3.7? Iγ,Mult.: from a comparison of B(E3)(2601 level) in Coulomb excitation, and the adopted $T_{1/2}$ value, along with Iγ(2601γ)/Iγ(992γ)<0.018 from (t,2nγ) and Δπ=yes (from level scheme), one gets branching(2601γ)=1.3% *5* and mult(2601γ)=(M2+E3) with δ>0.9.
2617.34	5/2+	124.48[#] *5*	5.24[#] *21*	2492.86	3/2+	M1(+E2)		5.45	α(K)=4.43 *7*; α(L)=0.778 *11*; α(M)=0.183 *3* α(N)=0.0468 *7*; α(O)=0.00957 *14*; α(P)=0.001139 *16* Mult.: A_2=−0.05 *5* from (t,2nγ) (1983Ma15).
		1721.08[‡] *13*	100[‡] *5*	896.28	7/2−	E1(+M2)		0.00145 *11*	α(K)=0.00094 *9*; α(L)=0.000143 *15*; α(M)=3.3×10−5 *4* α(N)=8.4×10−6 *9*; α(O)=1.72×10−6 *19*; α(P)=2.05×10−7 *22*; α(IPF)=0.000323 *5* Mult.: A_2=−0.04 *4* from (t,2nγ) (1983Ma15).
		2617.35[‡] *10*	50.2[‡] *14*	0.0	9/2−	E3(+M2)		0.00354 *97*	α(K)=0.00254 *75*; α(L)=4.3×10−4 *12*; α(M)=1.02×10−4 *29* α(N)=2.60×10−5 *72*; α(O)=5.3×10−6 *15*; α(P)=6.3×10−7 *19*; α(IPF)=0.00043 *6* Mult.: from Coulomb excitation.
2741.05	15/2+	140.13[#] *1*	14.47[#] *23*	2600.92	13/2+	M1(+E2)	<0.3	3.80 *11*	α(K)=3.05 *13*; α(L)=0.572 *20*; α(M)=0.136 *6* α(N)=0.0347 *15*; α(O)=0.0070 *3*; α(P)=0.000818 *14* B(M1)(W.u.)>0.042?; B(E2)(W.u.)<89? Mult.,δ: from α(exp)=4.1 *3* based on I(γ+ce)(140γ)/Iγ(1132+2741γ′s)=0.356 *22* in (^{7}Li,α2nγ) (1978Be17) and relative Iγ data in (t,2nγ) (1983Ma15).
		1132.46[‡a] *4*	67.7[#] *8*	1608.57	13/2+	M1+E2	+0.14 *4*	0.01380 *22*	α(K)=0.01133 *18*; α(L)=0.00189 *3*; α(M)=0.000441 *7* α(N)=0.0001128 *18*; α(O)=2.31×10−5 *4*; α(P)=2.76×10−6 *5*; α(IPF)=9.98×10−7 *16* B(M1)(W.u.)=0.00046 *7*; B(E2)(W.u.)=0.0025 *15* Mult.: A_2=−0.12 *1*, A_4=−0.02 *3* (1978Be17) in (^{7}Li,α2nγ). δ: from γ(θ) in (^{7}Li,α2nγ) (1978Be17), +0.05 from (t,2nγ) (1983Ma15).
		2741.03[‡a] *6*	100[#] *1*	0.0	9/2−	E3		0.00243	α(K)=0.001645 *23*; α(L)=0.000283 *4*; α(M)=6.65×10−5 *10* α(N)=1.699×10−5 *24*; α(O)=3.46×10−6 *5*; α(P)=4.06×10−7 *6*; α(IPF)=0.000416 *6* B(E3)(W.u.)=18.6 *25* Mult.: A_2=+0.48 *1* (1983Ma15) in (t,2nγ) and A_2=+0.42 *3* (1978Be17) in (^{7}Li,α2nγ).

$^{209}_{83}Bi_{126}$-20

Adopted Levels, Gammas (continued)

$\gamma(^{209}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	α[d]	Comments
2766.66	3/2+	149.3[#] 1	6.2[#] 3	2617.34	5/2+	[M1]	3.25	α(K)=2.65 4; α(L)=0.462 7; α(M)=0.1088 16 α(N)=0.0278 4; α(O)=0.00569 8; α(P)=0.000677 10
		273.80[#] 3	31.8[#] 4	2492.86	3/2+	[M1]	0.596	α(K)=0.486 7; α(L)=0.0841 12; α(M)=0.0198 3 α(N)=0.00506 7; α(O)=0.001033 15; α(P)=0.0001230 18
		323.74[#] 2	100[#] 2	2442.92	1/2+	M1	0.377	α(K)=0.308 5; α(L)=0.0530 8; α(M)=0.01246 18 α(N)=0.00319 5; α(O)=0.000651 10; α(P)=7.75×10^{-5} 11 Mult.: A_2=−0.08 4 (1983Ma15).
		2766.9 2	≈8	0.0	9/2−			E_γ,I_γ: Reported only in (n,n′γ). There is a peak at about this energy in the (t,2nγ) spectrum, and the evaluators estimate Iγ/Iγ(324γ)≈0.08.
2826.1	5/2−	1929.9[‡] 5	39 3	896.28	7/2−	[M1]	0.00397	α(K)=0.00294 5; α(L)=0.000483 7; α(M)=0.0001128 16 α(N)=2.88×10^{-5} 4; α(O)=5.90×10^{-6} 9; α(P)=7.08×10^{-7} 10; α(IPF)=0.000392 6 B(M1)(W.u.)=0.124 19 I_γ: weighted average of 33 9 from (t,2nγ), and 48 4 (1984Pr08) and 37.1 19 (2008Mi01) from (n,n′γ).
		2826.0[‡] 4	100 2	0.0	9/2−	E2	1.67×10^{-3}	α(K)=0.000850 12; α(L)=0.0001339 19; α(M)=3.11×10^{-5} 5 α(N)=7.93×10^{-6} 12; α(O)=1.620×10^{-6} 23; α(P)=1.93×10^{-7} 3; α(IPF)=0.000641 9 B(E2)(W.u.)=4.4 6 Mult.: A_2=+0.17 5 (1983Ma15) in (t,2nγ).
2845.20	1/2+	78.60[#] 10	≈15[#]	2766.66	3/2+			
		402.27[#] 3	100[#] 2	2442.92	1/2+			
2916.62	(1/2)+	149.98[#] 5	100[#]	2766.66	3/2+	M1+E2	3.21	α(K)=2.61 4; α(L)=0.457 7; α(M)=0.1074 15 α(N)=0.0275 4; α(O)=0.00561 8; α(P)=0.000668 10 Mult.: A_2=+0.04 8 (t,2nγ) (1983Ma15).
2955.93	(3/2)+	110.67[#] 15	4.2[#] 4	2845.20	1/2+	[M1]	7.63	α(K)=6.20 9; α(L)=1.091 16; α(M)=0.257 4 α(N)=0.0657 10; α(O)=0.01342 20; α(P)=0.001597 24
		338.65[#] 10	15.7[#] 18	2617.34	5/2+	[M1]	0.334	α(K)=0.272 4; α(L)=0.0469 7; α(M)=0.01101 16 α(N)=0.00282 4; α(O)=0.000575 8; α(P)=6.85×10^{-5} 10
		463.04[#] 8	100[#] 3	2492.86	3/2+	[M1]	0.1438	α(K)=0.1175 17; α(L)=0.0201 3; α(M)=0.00471 7 α(N)=0.001204 17; α(O)=0.000246 4; α(P)=2.94×10^{-5} 5
		513.0[#]	<3.6[#]	2442.92	1/2+	[M1]	0.1095	α(K)=0.0896 13; α(L)=0.01526 22; α(M)=0.00358 5 α(N)=0.000915 13; α(O)=0.000187 3; α(P)=2.23×10^{-5} 4 E_γ,I_γ: transition not observed. Eγ from energy level difference. Branching<3% is reported in (t,2nγ) (1983Ma15).
		2954.7[f] 4	<22	0.0	9/2−	[E3]	0.00223	α(K)=0.001424 20; α(L)=0.000242 4; α(M)=5.66×10^{-5} 8 α(N)=1.447×10^{-5} 21; α(O)=2.95×10^{-6} 5; α(P)=3.48×10^{-7} 5; α(IPF)=0.000493 7

$^{209}_{83}Bi_{126}$-21

$\gamma(^{209}Bi)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[b]	α[d]	Comments
								E_γ,I_γ: reported only in (n,n′γ) although there is a possible indication of a peak at this energy in (t,2nγ). From the (t,2nγ) spectrum, the evaluator estimates Iγ<22 relative to Iγ(463γ)=100 The energy expected from the level scheme is 2955.87 *7*.
2986.80	19/2$^+$	245.73[#] *2*	100[#]	2741.05	15/2$^+$	E2	0.224	B(E2)(W.u.)=0.387 *12* α(K)=0.1046 *15*; α(L)=0.0893 *13*; α(M)=0.0233 *4* α(N)=0.00593 *9*; α(O)=0.001114 *16*; α(P)=9.44×10^{-5} *14* Mult.: A_2=+0.26 *3* in (^{7}Li,α2nγ) (1978Be17), A_2=+0.31 *5* in (t,2nγ) (1983Ma15), $T_{1/2}$ rules out M2.
		385.9[f]	<0.8	2600.92	13/2$^+$	[M3]	2.14	α(K)=1.444 *21*; α(L)=0.520 *8*; α(M)=0.1349 *19* α(N)=0.0350 *5*; α(O)=0.00699 *10*; α(P)=0.000759 *11* B(M3)(W.u.)=8.E+3 *8* E_γ,I_γ: transition not observed. Eγ from level energy difference. Branching limit reported in (^{7}Li,α2nγ) (1978Be17).
3038.88	5/2$^+$	272.2[#] *1*	25.6[#] *6*	2766.66	3/2$^+$	(M1+E2)	0.606	α(K)=0.494 *7*; α(L)=0.0855 *12*; α(M)=0.0201 *3* α(N)=0.00514 *8*; α(O)=0.001050 *15*; α(P)=0.0001250 *18* Mult.: A_2=−0.02 *4* (1983Ma15).
		2142.78 *18*	100 *9*	896.28	7/2$^-$	E1	1.34×10^{-3}	α(K)=0.000598 *9*; α(L)=8.89×10^{-5} *13*; α(M)=2.05×10^{-5} *3* α(N)=5.22×10^{-6} *8*; α(O)=1.066×10^{-6} *15*; α(P)=1.276×10^{-7} *18*; α(IPF)=0.000626 *9* Mult.: A_2=−0.07 *3* (1983Ma15) in (t,2nγ). I_γ: from (t,2nγ).
3090.16	(7/2)$^+$	2194.1 *2*	18.6 *13*	896.28	7/2$^-$	[E1]	1.35×10^{-3}	α(K)=0.000576 *8*; α(L)=8.55×10^{-5} *12*; α(M)=1.97×10^{-5} *3* α(N)=5.02×10^{-6} *7*; α(O)=1.026×10^{-6} *15*; α(P)=1.227×10^{-7} *18*; α(IPF)=0.000661 *10*
		3089.96 *12*	100 *2*	0.0	9/2$^-$	(E1+M2)	0.00161 *3*	α(K)=0.000353 *20*; α(L)=5.2×10^{-5} *4*; α(M)=1.21×10^{-5} *8* α(N)=3.07×10^{-6} *20*; α(O)=6.3×10^{-7} *4*; α(P)=7.6×10^{-8} *5*; α(IPF)=0.001189 *18* Mult.: A_2=+0.10 *5* (1983Ma15).
3119.48	3/2$^-$	2223.23 *10*	100	896.28	7/2$^-$	E2	0.00195	B(E2)(W.u.)=7 *5* α(K)=0.001308 *19*; α(L)=0.000212 *3*; α(M)=4.93×10^{-5} *7* α(N)=1.258×10^{-5} *18*; α(O)=2.56×10^{-6} *4*; α(P)=3.03×10^{-7} *5*; α(IPF)=0.000366 *6* Mult.: A_2=+0.09 *5* (1983Ma15) in (t,2nγ).
3132.97	11/2$^+$	1524.2[#] *3*	28.3[#] *25*	1608.57	13/2$^+$	[M1]	0.00666	α(K)=0.00537 *8*; α(L)=0.000887 *13*; α(M)=0.000207 *3* α(N)=5.29×10^{-5} *8*; α(O)=1.084×10^{-5} *16*; α(P)=1.299×10^{-6} *19*; α(IPF)=0.0001243 *18*
		3132.96 *9*	100 *2*	0.0	9/2$^-$	E1	1.61×10^{-3}	α(K)=0.000327 *5*; α(L)=4.82×10^{-5} *7*; α(M)=1.108×10^{-5} *16* α(N)=2.82×10^{-6} *4*; α(O)=5.78×10^{-7} *8*; α(P)=6.94×10^{-8} *10*; α(IPF)=0.001218 *17* Mult.: A_2=−0.24 *4* (1983Ma15) in (t,2nγ).

Adopted Levels, Gammas (continued)

$\gamma(^{209}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	α[d]	Comments
3135.77	(15/2)$^+$	394.72[#] *7*	13.6[#] *4*	2741.05	15/2$^+$	M1	0.220	α(K)=0.180 *3*; α(L)=0.0309 *5*; α(M)=0.00725 *11* α(N)=0.00185 *3*; α(O)=0.000379 *6*; α(P)=4.52×10^{-5} *7* Mult.: A_2=+0.12 *8* (1983Ma15) in (t,2nγ). I_γ: Other: 17.5 *23* (2008Mi01) in (n,n′γ).
		1527.13 *14*	100 *1*	1608.57	13/2$^+$	M1	0.00663	α(K)=0.00535 *8*; α(L)=0.000882 *13*; α(M)=0.000206 *3* α(N)=5.27×10^{-5} *8*; α(O)=1.079×10^{-5} *16*; α(P)=1.292×10^{-6} *18*; α(IPF)=0.0001259 *18* Mult.: A_2=−0.06 *2* (1983Ma15) in (t,2nγ).
3152.83	(9/2)$^+$	3152.80 *20*	100	0.0	9/2$^-$	E1	1.61×10^{-3}	α(K)=0.000324 *5*; α(L)=4.77×10^{-5} *7*; α(M)=1.097×10^{-5} *16* α(N)=2.79×10^{-6} *4*; α(O)=5.72×10^{-7} *8*; α(P)=6.87×10^{-8} *10*; α(IPF)=0.001228 *18* Mult.: A_2=+0.26 *6* (1983Ma15) in (t,2nγ).
3154.06	17/2$^+$	167.16[#] *6*	6.59[#] *19*	2986.80	19/2$^+$	M1	2.36	α(K)=1.92 *3*; α(L)=0.335 *5*; α(M)=0.0789 *11* α(N)=0.0202 *3*; α(O)=0.00412 *6*; α(P)=0.000491 *7* Mult.: A_2=−0.25 *10* (1983Ma15) in (t,2nγ).
		413.04 *3*	100 *2*	2741.05	15/2$^+$	M1(+E2)	0.195	α(K)=0.1594 *23*; α(L)=0.0273 *4*; α(M)=0.00641 *9* α(N)=0.001640 *23*; α(O)=0.000335 *5*; α(P)=3.99×10^{-5} *6* Mult.: A_2=−0.32 *3* (1983Ma15) in (t,2nγ).
3159.33	3/2$^{(+)}$	242.73 *5*	82 *16*	2916.62	(1/2)$^+$			E_γ: weighted average of 242.73 *5* in (t,2nγ) and 242.7 *1* in (^{3}He,dγ). I_γ: weighted average of 92 *12* in (t,2nγ) and 55 *20* in (^{3}He,dγ).
		314.2 *2*	100 *10*	2845.20	1/2$^+$	(M1)	0.409	α(K)=0.334 *5*; α(L)=0.0576 *9*; α(M)=0.01352 *19* α(N)=0.00346 *5*; α(O)=0.000707 *10*; α(P)=8.42×10^{-5} *12* Mult.: A_2=−0.15 *10* (1983Ma15) in (t,2nγ). E_γ: weighted average of 314.2 *2* in (t,2nγ) and 314.2 *2* in (^{3}He,dγ). I_γ: weighted average of 100 *13* in (t,2nγ) and 100 *10* in (^{3}He,dγ).
		392.56 *10*	56 *16*	2766.66	3/2$^+$			E_γ: weighted average of 392.56 *10* in (t,2nγ) and 39.5 *2* in (^{3}He,dγ). I_γ: weighted average of 72 *5* in (t,2nγ) and 40 *10* in (^{3}He,dγ).
		716.5 *2*	90 *20*	2442.92	1/2$^+$			E_γ,I_γ: from (^{3}He,dγ) only.
3169.07	(13/2)$^+$	1560.49 *4*	100	1608.57	13/2$^+$	M1	0.00630	α(K)=0.00506 *7*; α(L)=0.000835 *12*; α(M)=0.000195 *3* α(N)=4.98×10^{-5} *7*; α(O)=1.020×10^{-5} *15*; α(P)=1.223×10^{-6} *18*; α(IPF)=0.0001449 *21* Mult.: A_2=+0.18 *5* (1983Ma15) in (t,2nγ).
3197.60	(1/2$^+$,3/2$^+$)	352.30 *8*	70 *20*	2845.20	1/2$^+$	(M1)	0.300	α(K)=0.245 *4*; α(L)=0.0421 *6*; α(M)=0.00988 *14* α(N)=0.00253 *4*; α(O)=0.000517 *8*; α(P)=6.15×10^{-5} *9* E_γ: from (t,2nγ). I_γ: from (^{3}He,dγ). Mult.: A_2=+0.03 *5* (1983Ma15) in (t,2nγ).

$^{209}_{83}Bi_{126}$-23

Adopted Levels, Gammas (continued)

γ(^{209}Bi) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	α[d]	Comments
3197.60	(1/2+,3/2+)	431.2 2	50 15	2766.66	3/2+			E_γ,I_γ: from (^{3}He,dγ) only.
		705.1 2	100 10	2492.86	3/2+			E_γ,I_γ: from (^{3}He,dγ) only.
3211.85	(17/2)+	225.05[#] 2	100[#]	2986.80	19/2+	(M1)	1.026	α(K)=0.836 12; α(L)=0.1451 21; α(M)=0.0341 5 α(N)=0.00873 13; α(O)=0.001783 25; α(P)=0.000212 3 Mult.: A_2=−0.15 4 (1983Ma15) in (t,2nγ).
3221.65	5/2+	131.45[#] 8	17.1[#] 9	3090.16	(7/2)+			
		265.74[#] 8	49.3[#] 27	2955.93	(3/2)+			
		455.02[#] 10	100[#] 4	2766.66	3/2+	(M1)	0.1506	α(K)=0.1231 18; α(L)=0.0210 3; α(M)=0.00494 7 α(N)=0.001262 18; α(O)=0.000258 4; α(P)=3.08×10^{-5} 5 Mult.: A_2=−0.12 10 (1983Ma15) in (t,2nγ).
3269.64	1/2+,3/2+	424.5[#] 1	100[#] 10	2845.20	1/2+	(M1)	0.181	α(K)=0.1482 21; α(L)=0.0254 4; α(M)=0.00595 9 α(N)=0.001523 22; α(O)=0.000311 5; α(P)=3.71×10^{-5} 6 E_γ,I_γ: also placed from 3579 level. Component from 3269 established on the basis of γγ. Mult.: A_2=+0.14 3 (1983Ma15) in (t,2nγ).
		826.5 2	30 10	2442.92	1/2+			E_γ,I_γ: from (^{3}He,dγ) only.
3311.14	(7/2+,9/2+)	2414.84 4	100 3	896.28	7/2−			
		3310.6[@][f] 1	47.6[@] 16	0.0	9/2−			I_γ: from (n,n′γ). The 3310γ is not reported in (t,2nγ); however, there is a peak at this energy in the (t,2nγ) spectrum in 1983Ma15, with Iγ/Iγ(2414γ) estimated by evaluators as ≈0.5. The energy expected from the level scheme is 3311.15 6.
3354.8	(5/2+)	588.1[#] 4	100[#]	2766.66	3/2+			Mult.: A_2=+0.05 8 (1983Ma15) in (t,2nγ).
3362.00	(5/2+,7/2+,9/2+)	2465.70 10	100	896.28	7/2−	D		Mult.: A_2=−0.01 10 (1983Ma15) in (t,2nγ).
3378.16	(9/2+)	2481.94 18	44 3	896.28	7/2−			I_γ: from (n,n′γ). Iγ(2481γ)/Iγ(3378γ)<0.11 is reported in (t,2nγ).
		3378.11 10	100 3	0.0	9/2−	(E1)	1.68×10^{-3}	α(K)=0.000291 4; α(L)=4.28×10^{-5} 6; α(M)=9.84×10^{-6} 14 α(N)=2.51×10^{-6} 4; α(O)=5.13×10^{-7} 8; α(P)=6.17×10^{-8} 9; α(IPF)=0.001334 19 Mult.: A_2=+0.10 5 (1983Ma15) in (t,2nγ).
3393.38	(15/2+)	1784.8[#] 2	100[#]	1608.57	13/2+	D		α(K)=0.00359 5; α(L)=0.000591 9; α(M)=0.0001379 20; α(N+..)=0.000332 5 α(N)=3.53×10^{-5} 5; α(O)=7.22×10^{-6} 11; α(P)=8.66×10^{-7} 13; α(IPF)=0.000289 4 E_γ: Other: 1785.9 1 from (n,n′γ) (1984Pr08). Mult.: A_2=−0.21 4 (1983Ma15) in (t,2nγ).
3395.00	5/2−,7/2,9/2,11/2−	2498.7[@] 1	100[@]	896.28	7/2−			
		3395.6[@][f] 5	25[@]	0.0	9/2−			E_γ: observed only in 1996De48.
3406.21	13/2+	270.4[#] 1	34.4[#] 19	3135.77	(15/2)+			
		806.36 15	52 8	2599.91	11/2+			

$^{209}_{83}Bi_{126}$-24

γ(^{209}Bi) (continued)

E_i(level)	J^π_i	E_γ†	I_γ†	E_f	J^π_f	Mult.[b]	α[d]	Comments
3406.21	13/2$^+$	1797.64 *12*	100 *3*	1608.57	13/2$^+$	M1	0.00458	α(K)=0.00353 *5*; α(L)=0.000580 *9*; α(M)=0.0001354 *19* α(N)=3.46×10^{-5} *5*; α(O)=7.09×10^{-6} *10*; α(P)=8.50×10^{-7} *12*; α(IPF)=0.000298 *5* Mult.: A_2=+0.23 *4* (1983Ma15) in (t,2nγ).
3449.7	(7/2$^+$)	2553.4 *4*	100	896.28	7/2$^-$	D		α(K)=0.000451 *7*; α(L)=6.68×10^{-5} *10*; α(M)=1.537×10^{-5} *22*; α(N+..)=0.000896 *13* α(N)=3.92×10^{-6} *6*; α(O)=8.01×10^{-7} *12*; α(P)=9.61×10^{-8} *14*; α(IPF)=0.000891 *13* E_γ: weighted average of 2553.9 *6* in (t,2nγ), 2552.8 *2* in (^{3}He,dγ) and 2554.0 *2* in (n,n′γ). Mult.: A_2=+0.10 *17* (1983Ma15) in (t,2nγ).
3464.12	11/2$^+$	3464.09 *10*	100	0.0	9/2$^-$	E1	1.71×10^{-3}	α(K)=0.000280 *4*; α(L)=4.11×10^{-5} *6*; α(M)=9.46×10^{-6} *14* α(N)=2.41×10^{-6} *4*; α(O)=4.93×10^{-7} *7*; α(P)=5.93×10^{-8} *9*; α(IPF)=0.001376 *20* Mult.: A_2=−0.28 *8* (1983Ma15) in (t,2nγ).
3467.67	19/2$^+$	313.70# *16*	27# *3*	3154.06	17/2$^+$	M1	0.411	α(K)=0.335 *5*; α(L)=0.0578 *9*; α(M)=0.01358 *20* α(N)=0.00347 *5*; α(O)=0.000710 *10*; α(P)=8.45×10^{-5} *12* Mult.: from $\gamma(\theta)$ in (t,2nγ) (1983Ma15).
		480.87# *5*	100# *2*	2986.80	19/2$^+$	M1	0.1300	α(K)=0.1063 *15*; α(L)=0.0181 *3*; α(M)=0.00426 *6* α(N)=0.001088 *16*; α(O)=0.000222 *4*; α(P)=2.65×10^{-5} *4* Mult.: A_2=+0.43 *4* (1983Ma15) in (t,2nγ).
3486.93	(19/2$^+$)	500.12# *5*	100#	2986.80	19/2$^+$	(M1)	0.1172	α(K)=0.0958 *14*; α(L)=0.01633 *23*; α(M)=0.00383 *6* α(N)=0.000979 *14*; α(O)=0.000200 *3*; α(P)=2.39×10^{-5} *4* Mult.: A_2=+0.42 *4* (1983Ma15) in (t,2nγ).
3489.88	(7/2,9/2)	2593.6 *2*	100 *4*	896.28	7/2$^-$			
		3489.6 *8*	36.2 *17*	0.0	9/2$^-$			
3502.23	(15/2$^+$)	290.38# *10*	100	3211.85	(17/2)$^+$	D		Mult.: A_2=−0.13 *8* (1983Ma15) in (t,2nγ).
3505.28	5/2$^-$,7/2$^-$	921.9@ *8*	100@ *25*	2583.02	(7/2)$^+$			
		2609.0@ *2*	39@ *3*	896.28	7/2$^-$			
3541.60	(5/2$^-$,7/2,9/2)	2645.3@ *2*	100@ *5*	896.28	7/2$^-$			
		3542.7@f *4*	19.2@ *18*	0.0	9/2$^-$			I_γ: reported only in (n,n′γ). Branching is too weak to be seen in the (t,2nγ) spectrum. The energy expected from the level scheme is 3541.61 *18*.
3575.08	(5/2,7/2$^+$)	808.0@ *10*	100@ *40*	2766.66	3/2$^+$			
		2678.8 *2*	58 *4*	896.28	7/2$^-$			
3579.00	(17/2$^+$ to 21/2$^+$)	424.9		3154.06	17/2$^+$			E_γ,I_γ: also placed from the 3270 level. Total intensity of the doublet is 126 *4* relative to Iγ(592.2)=100 as upper limit. Component from 3579 is established on the basis of $\gamma\gamma$. The measured energy of the multiplet

From ENSDF

$^{209}_{83}$Bi$_{126}$-25

Adopted Levels, Gammas (continued)

γ(^{209}Bi) (continued)

E_i(level)	J^{π}_i	E_γ†	I_γ†	E_f	J^{π}_f	Mult.[b]	α[d]	Comments
								is 424.49 *8*. Eγ is from the level energy difference. A comparison of this value with the measured energy suggests that the dominant component of the 424 multiplet is from a placement other than the 3579 level (evaluators).
3579.00	($17/2^+$ to $21/2^+$)	592.2# *1*	100# *6*	2986.80	$19/2^+$	D		α(K)=0.0614 *9*; α(L)=0.01041 *15*; α(M)=0.00244 *4*; α(N+..)=0.000767 *11* α(N)=0.000624 *9*; α(O)=0.0001276 *18*; α(P)=1.522×10^{-5} *22* Mult.: A_2=−0.36 *12* (1983Ma15) in (t,2nγ).
3590.50		745.3& *2*	100&	2845.20	$1/2^+$			
3597.14	$19/2^+$	443.15# *12*	18.4# *14*	3154.06	$17/2^+$			
		610.33# *15*	100# *3*	2986.80	$19/2^+$	M1	0.0693	α(K)=0.0567 *8*; α(L)=0.00961 *14*; α(M)=0.00225 *4* α(N)=0.000576 *8*; α(O)=0.0001177 *17*; α(P)=1.405×10^{-5} *20* Mult.: A_2=+0.49 *7* (1983Ma15) in (t,2nγ).
3601.72	($5/2^+$,$7/2^+$,$9/2^+$)	2705.42 *10*	100 *3*	896.28	$7/2^-$	(E1)	1.47×10^{-3}	α(K)=0.000412 *6*; α(L)=6.08×10^{-5} *9*; α(M)=1.400×10^{-5} *20* α(N)=3.57×10^{-6} *5*; α(O)=7.30×10^{-7} *11*; α(P)=8.76×10^{-8} *13*; α(IPF)=0.000980 *14* Mult.: A_2=−0.29 *8* (1983Ma15) in (t,2nγ).
		3601.7@ *6*	6.2@ *12*	0.0	$9/2^-$			Iγ: reported only in (n,n′γ). Branching is too weak to be seen in the (t,2nγ) spectrum.
3633.85	$1/2^-$	514.37& *2*	100& *30*	3119.48	$3/2^-$	[M1]	0.1087	α(K)=0.0889 *13*; α(L)=0.01515 *22*; α(M)=0.00355 *5* α(N)=0.000908 *13*; α(O)=0.000186 *3*; α(P)=2.21×10^{-5} *4*
		677.8& *2*	20& *6*	2955.93	$(3/2)^+$	[E1]	0.00538	α(K)=0.00446 *7*; α(L)=0.000706 *10*; α(M)=0.0001640 *23* α(N)=4.17×10^{-5} *6*; α(O)=8.44×10^{-6} *12*; α(P)=9.77×10^{-7} *14*
		788.8& *2*	3& *1*	2845.20	$1/2^+$	[E1]	0.00403	α(K)=0.00335 *5*; α(L)=0.000523 *8*; α(M)=0.0001214 *17* α(N)=3.09×10^{-5} *5*; α(O)=6.26×10^{-6} *9*; α(P)=7.30×10^{-7} *11*
		867.2& *2*	20& *6*	2766.66	$3/2^+$	[E1]	0.00338	α(K)=0.00281 *4*; α(L)=0.000436 *7*; α(M)=0.0001011 *15* α(N)=2.57×10^{-5} *4*; α(O)=5.22×10^{-6} *8*; α(P)=6.11×10^{-7} *9*
		1140.8& *2*	6& *2*	2492.86	$3/2^+$	[E1]	0.00207	α(K)=0.001721 *24*; α(L)=0.000263 *4*; α(M)=6.07×10^{-5} *9* α(N)=1.546×10^{-5} *22*; α(O)=3.15×10^{-6} *5*; α(P)=3.71×10^{-7} *6*; α(IPF)=3.26×10^{-6} *5*
		1191.0& *2*	4& *1*	2442.92	$1/2^+$	[E1]	0.00193	α(K)=0.001596 *23*; α(L)=0.000243 *4*; α(M)=5.62×10^{-5} *8* α(N)=1.431×10^{-5} *20*; α(O)=2.91×10^{-6} *4*; α(P)=3.44×10^{-7} *5*; α(IPF)=1.251×10^{-5} *19*
3692.14	($11/2^-$)	3692.1 *2*	100	0.0	$9/2^-$			

$^{209}_{83}Bi_{126}$-26

Adopted Levels, Gammas (continued)

γ(^{209}Bi) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	α[d]	Comments
3703.55	$7/2^{(+)}$	664.8[#] *2*	100[#] *6*	3038.88	$5/2^+$	D		α(K)=0.0454 *7*; α(L)=0.00767 *11*; α(M)=0.00180 *3*; α(N+..)=0.000564 *8* α(N)=0.000459 *7*; α(O)=9.39×10^{-5} *14*; α(P)=1.121×10^{-5} *16* Mult.: A_2=−0.25 *10* (1983Ma15) in (t,2nγ).
		2806.2[@] *6*	8[@] *3*	896.28	$7/2^-$			E_γ,I_γ: reported only in (n,n′γ), intensity normalized to Iγ(3703).
		3703.4 *6*	89 *2*	0.0	$9/2^-$			E_γ: from (t,2nγ). Eγ=3702.3 *1* is reported in (n,n′γ), but this value is inconsistent with E(level) deduced from the 664.8γ.
3717.64	$(7/2^+,9/2^+,11/2^+)$	3717.6[@] *1*	100[@]	0.0	$9/2^-$			
3752.2		2855.9[@] *3*	100[@]	896.28	$7/2^-$			
3759.0		2862.7[&] *5*	100[&]	896.28	$7/2^-$			
3766.9	$(11/2)^+$	3766.9[@] *3*	100[@]	0.0	$9/2^-$			
3772.60		2876.3[&] *2*	100[&]	896.28	$7/2^-$			
3783.08	(5/2,7/2,9/2)	2886.78 *14*	100	896.28	$7/2^-$			E_γ: weighted average of 2887.3 *4* in (t,2nγ), 2886.3 *3* in (^{3}He,dγ) and 2886.8 *1* in (n,n′γ).
3800.85	$(7/2^+,9/2^+)$	2904.8 *3*	100 *5*	896.28	$7/2^-$			E_γ: weighted average of 2904.5 *2* in (n,n′γ) and 2905.1 *2* in (^{3}He,dγ).
		3800.7[@] *2*	70[@] *5*	0.0	$9/2^-$			
3808.29		2199.7[&] *2*	100[&]	1608.57	$13/2^+$			
3812.25	$23/2^+$	825.45[#] *15*	100[#]	2986.80	$19/2^+$	E2	0.01024	α(K)=0.00795 *12*; α(L)=0.001739 *25*; α(M)=0.000420 *6* α(N)=0.0001072 *15*; α(O)=2.13×10^{-5} *3*; α(P)=2.32×10^{-6} *4* Mult.: A_2=+0.36 *7* (1983Ma15) in (t,2nγ).
3816.70		2920.4[&] *2*	100[&]	896.28	$7/2^-$			
3817.86	$(11/2^+,13/2^+)$	1253[@] *1*	94[@] *31*	2564.14	$(9/2)^+$			
		2209.3[@] *2*	100[@] *9*	1608.57	$13/2^+$			
3849.94		3849.9[@] *2*	100[@]	0.0	$9/2^-$			
3884.3		3884.3[@] *5*	100[@]	0.0	$9/2^-$			
3889.5		3889.5[@] *3*	100[@]	0.0	$9/2^-$			
3905.9		3009.6[@] *3*	100[@] *7*	896.28	$7/2^-$			
		3905.9[@] *7*	19[@] *4*	0.0	$9/2^-$			
3913.26	$(1/2\text{ to }7/2^+)$	1420.4[&] *2*	100[&]	2492.86	$3/2^+$			
3921.22	$(7/2^+,9/2^+)$	3024.5[@] *5*	25[@] *5*	896.28	$7/2^-$			
		3921.2[@] *1*	100[@] *5*	0.0	$9/2^-$			
3936.74	$(13/2^-)$	3936.7[@] *1*	100[@]	0.0	$9/2^-$			
3962.27	(7/2,9/2)	3066.1[@] *3*	83[@] *6*	896.28	$7/2^-$			
		3962.1[@] *3*	100[@] *6*	0.0	$9/2^-$			
3980.04	$(11/2,13/2)^-$	3980.0[@] *1*	100[@]	0.0	$9/2^-$			
4000.71	$9/2^+,11/2,13/2^-$	2391.8[@] *2*	100[@] *10*	1608.57	$13/2^+$			

Adopted Levels, Gammas (continued)

$\gamma(^{209}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	Comments
4000.71	$9/2^+,11/2,13/2^-$	4001.0[@] 2	57[@] 5	0.0	$9/2^-$		
4009.3		4009.3[@] 4	100[@]	0.0	$9/2^-$		
4036.5		4036.5[@] 4	100[@]	0.0	$9/2^-$		
4046.54		4046.5[@] 2	100[@]	0.0	$9/2^-$		
4088.34	$(5/2 \text{ to } 13/2)^-$	4088.3[@] 1	100[@]	0.0	$9/2^-$		
4091.4	$(1/2^-,3/2^-)$	1648.5[&] 4	100[&]	2442.92	$1/2^+$		
4096.34	$(9/2^+,11/2,13/2^-)$	2488.2[@] 3	53[@] 6	1608.57	$13/2^+$		
		4096.1[@] 2	100[@] 3	0.0	$9/2^-$		
4096.59	$(1/2 \text{ to } 7/2^-)$	977.1[&] 2	100[&]	3119.48	$3/2^-$		
4134.0		4134[@] 2	100[@]	0.0	$9/2^-$		
4141.95	$21/2^{(+)}$	544.85[#] 10	89[#] 3	3597.14	$19/2^+$	D	α(K)=0.0764 11; α(L)=0.01299 19; α(M)=0.00305 5; α(N+..)=0.000957 14 α(N)=0.000779 11; α(O)=0.0001592 23; α(P)=1.90×10^{-5} 3 Mult.: A_2=−0.23 7 (1983Ma15) in (t,2nγ).
		654.98[#] 10	100[#] 4	3486.93	$(19/2^+)$	D	α(K)=0.0471 7; α(L)=0.00797 12; α(M)=0.00187 3; α(N+..)=0.000587 9 α(N)=0.000478 7; α(O)=9.77×10^{-5} 14; α(P)=1.166×10^{-5} 17 Mult.: A_2=−0.28 8 (1983Ma15) in (t,2nγ).
4148.11	$(9/2^+,11/2^-)$	2539.6[@] 2	100[@] 10	1608.57	$13/2^+$		
		3251.6[@] 6	20[@] 5	896.28	$7/2^-$		
		4148.0[@] 2	75[@] 5	0.0	$9/2^-$		
4158.79	$^-$	3262.8[@] 5	22[@] 4	896.28	$7/2^-$		
		4158.7[@] 2	100[@] 4	0.0	$9/2^-$		
4160.9	$(13/2^-)$	4160.9[@] 7	100[@]	0.0	$9/2^-$		
4176.14	$(7/2,9/2,11/2)^+$	4176.1[@] 1	100[@]	0.0	$9/2^-$		
4207.5		4207.5[@] 4	100[@]	0.0	$9/2^-$		
4222.9		4222.9[@] 7	100[@]	0.0	$9/2^-$		
4233.75	$(13/2)^-$	4233.7[@] 2	100[@]	0.0	$9/2^-$		
4236.9		3340.6[&] 3	100[&]	896.28	$7/2^-$		
4262.95		4262.9[@] 2	100[@]	0.0	$9/2^-$		
4297.73		3401.6[@] 3	100[@] 9	896.28	$7/2^-$		
		4297.6[@] 2	80[@] 5	0.0	$9/2^-$		
4300.75	$(^+)$	4300.7[@] 1	100[@]	0.0	$9/2^-$		
4335.3		2726.7[@] 3	100[@]	1608.57	$13/2^+$		
4340.7		4340.7[@] 5	100[@]	0.0	$9/2^-$		
4361.89	$(11/2,13/2,15/2)^-$	2753.3[@] 2	100[@]	1608.57	$13/2^+$		
4376.5		4376.5[@] 6	100[@]	0.0	$9/2^-$		

$^{209}_{83}Bi_{126}$-28

γ(^{209}Bi) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	Comments
4381.31		3485.0[@] 2	100[@]	896.28	7/2⁻		
4388.15		3491.9[@] 2	100[@] 8	896.28	7/2⁻		
		4387.7[@] 5	22[@] 3	0.0	9/2⁻		
4397.85		4397.8[@] 2	100[@]	0.0	9/2⁻		
4409.05		4409.0[@] 2	100[@]	0.0	9/2⁻		
4415.33	1/2⁻	1295.9[&] 2	100[&] 30	3119.48	3/2⁻		
		1922.4[&] 2	3[&] 1	2492.86	3/2⁺		
4426.7		3530.4[&] 3	100[&]	896.28	7/2⁻		
4441.7	(7/2)⁻	3542.6[&] 3	[&]	896.28	7/2⁻		
		4439.1[&] 3	[&]	0.0	9/2⁻		E_γ: Other: 4441.6 keV from ^{208}Pb(^{3}He,dγ).
4471.0	(9/2⁺,11/2,13/2⁻)	2862.5[@] 3	100[@] 6	1608.57	13/2⁺		
		4470.5[@] 6	19.4[@] 22	0.0	9/2⁻		
4478.2		3581.9[&] 3	100[&]	896.28	7/2⁻		
4484.79		2876.2[@] 1	100[@]	1608.57	13/2⁺		
4506.85		4506.8[@] 2	100[@]	0.0	9/2⁻		
4515.23	(9/2⁺,11/2,13/2⁻)	2906.6[@] 1	100[@] 3	1608.57	13/2⁺		
		4515.3[@] 2	20.0[@] 13	0.0	9/2⁻		
4516.5		3620.2[&] 3	100[&]	896.28	7/2⁻		
4588.3		3692.1[&] 3	[&]	896.28	7/2⁻		
		4587.8[&] 6	100[&]	0.0	9/2⁻		
4602.6	(5/2⁻,7/2,9/2⁺)	4602.5[@] 13	100[@]	0.0	9/2⁻		
4646.1		4646.0[@] 3	100[@]	0.0	9/2⁻		
4682.0		3785.4[@] 16	100[@] 32	896.28	7/2⁻		
		4682.0[@] 9	60[@] 12	0.0	9/2⁻		
4739.62		3843.3[&] 2	100[&]	896.28	7/2⁻		
4750.79		3854.4[@] 2	100[@] 7	896.28	7/2⁻		
		4750.9[@] 3	33.3[@] 20	0.0	9/2⁻		
4755.76	(7/2,9/2,11/2)	4755.7[@] 2	100[@]	0.0	9/2⁻	(D)[c]	
4762.3		3866.0[@] 3	100[@] 10	896.28	7/2⁻		
		4762.2[@] 5	45[@] 5	0.0	9/2⁻		
4786.32		3890.0[&] 2	100[&]	896.28	7/2⁻		
4789.8	(9/2⁺,11/2,13/2⁻)	3181.1[@] 5	100[@] 20	1608.57	13/2⁺		
		4790.0[@] 6	100[@] 8	0.0	9/2⁻		
4796.1	(7/2,9/2,11/2)	4796.0[@] 3	100[@]	0.0	9/2⁻	(D)	
4830.3	(7/2,9/2,11/2)	4830.2[@] 3	100[@]	0.0	9/2⁻	(D)[c]	

γ(^{209}Bi) (continued)

E$_i$(level)	J$_i^\pi$	E$_\gamma$[†]	I$_\gamma$[†]	E$_f$	J$_f^\pi$	Mult.[b]
4837.6		3941.4[@] *6*	70[@] *11*	896.28	7/2$^-$	
		4837.5[@] *3*	100[@] *7*	0.0	9/2$^-$	
4853.46		4853.4[@] *2*	100[@]	0.0	9/2$^-$	
4879.47		3983.1[@] *2*	100[@] *9*	896.28	7/2$^-$	
		4879.6[@] *4*	27[@] *3*	0.0	9/2$^-$	
4904.2		4007.9[&] *3*	100[&]	896.28	7/2$^-$	
4948.3		4051.8[@] *5*	100[@] *8*	896.28	7/2$^-$	
		4948.6[@] *8*	40[@] *5*	0.0	9/2$^-$	
4967.6		4967.5[@] *15*	100[@]	0.0	9/2$^-$	
4996.2	(13/2)$^-$	4996.1[@] *3*	100[@]	0.0	9/2$^-$	
5054.0		4157.7[&] *4*	100[&]	896.28	7/2$^-$	
5056.7	(11/2)$^+$	5056.6[@] *6*	100[@]	0.0	9/2$^-$	
5152.2		4255.9[&] *3*	100[&]	896.28	7/2$^-$	
5167.3	(9/2$^+$,11/2,13/2$^-$)	3558.5[@] *3*	100[@] *8*	1608.57	13/2$^+$	
		5167.6[@] *5*	25.6[@] *22*	0.0	9/2$^-$	
5182.7	5/2$^-$,7/2$^-$	5182.6[@] *7*	100[@]	0.0	9/2$^-$	
5190.7		4294.4[&] *4*	100[&]	896.28	7/2$^-$	
5235.1	(7/2,9/2,11/2)	5235.0[@] *3*	100[@]	0.0	9/2$^-$	(D)[c]
5281.9	(7/2,9/2,11/2)	5281.8[@] *11*	100[@]	0.0	9/2$^-$	(D)[c]
5292.7		2095.1[&] *3*	100[&]	3197.60	(1/2$^+$,3/2$^+$)	
		2525.6[&] *5*	100[&]	2766.66	3/2$^+$	
5293.4	(7/2,9/2,11/2)	5293.3[@] *6*	100[@]	0.0	9/2$^-$	(D)[c]
5312.6	(7/2,9/2,11/2)	5312.5[@] *13*	100[@]	0.0	9/2$^-$	(D)[c]
5354.0	(7/2,9/2,11/2)	5353.9[@] *4*	100[@]	0.0	9/2$^-$	(D)[c]
5369.8	(1/2,3/2,5/2$^+$)	2926.9[&] *4*	100[&]	2442.92	1/2$^+$	
5404.5	(11/2)$^+$	5404.4[@] *6*	100[@]	0.0	9/2$^-$	
5411.2		5411.1[@] *6*	100[@]	0.0	9/2$^-$	
5424.62	(9/2$^+$,11/2)	3815.9[@] *4*	100[@] *12*	1608.57	13/2$^+$	
		5424.6[@] *3*	80[@] *4*	0.0	9/2$^-$	
5440.2	(7/2,9/2,11/2)	5440.1[@] *10*	100[@]	0.0	9/2$^-$	
5464.6	11/2$^+$	5464.5[@] *8*	100[@]	0.0	9/2$^-$	
5484.4	(7/2,9/2,11/2)	5484.3[@] *5*	100[@]	0.0	9/2$^-$	(D)[c]
5498.0	(7/2,9/2,11/2)	5497.9[@] *10*	100[@]	0.0	9/2$^-$	(D)[c]
5510.53	(9/2$^+$,11/2,13/2$^-$)	3902.0[@] *4*	100[@] *13*	1608.57	13/2$^+$	
		5510.4[@] *3*	70[@] *4*	0.0	9/2$^-$	

$\gamma(^{209}Bi)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	α[d]	Comments
5523.5		4627.0[@] 5	100[@] 12	896.28	7/2−			
		5523.9[@] 9	44[@] 8	0.0	9/2−			
5538.4	(7/2,9/2,11/2)	4641.8[@] 8	100[@] 18	896.28	7/2−			
		5538.7[@] 10	59[@] 12	0.0	9/2−			
5559.6	(7/2,9/2,11/2)	4663.0[@] 7	100[@] 8	896.28	7/2−			
		5559.8[@] 8	62[@] 8	0.0	9/2−			
5563.4		3070.5[&] 6	100[&]	2492.86	3/2+			
5570.6	(11/2+)	5570.5[@] 7	100[@]	0.0	9/2−			
5589.2	(11/2+)	5589.1[@] 7	100[@]	0.0	9/2−			
5609	11/2−	5609[‡a] 5	100[#]	0.0	9/2−	M1	0.00252	B(M1)(W.u.)=0.26 6 α(K)=0.000201 3; α(L)=3.20×10^{-5} 5; α(M)=7.44×10^{-6} 11 α(N)=1.90×10^{-6} 3; α(O)=3.90×10^{-7} 6; α(P)=4.69×10^{-8} 7; α(IPF)=0.00228 4 Mult.: from $\gamma(\theta)$ and γ(pol) in (γ,γ').
5609.8		4713.5[@] 3	100[@]	896.28	7/2−			
5652.6	(11/2)+	5652.5[@] 8	100[@]	0.0	9/2−			
5662.1	(7/2,9/2,11/2)	5662[‡a] 2	[#]	0.0	9/2−			
5668.3		4772.0[&] 3	100[&]	896.28	7/2−			
5788.7		4892.4[&] 4	100[&]	896.28	7/2−			
5925.1	(11/2)+	5925.0[@] 17	100[@]	0.0	9/2−			
6301.1		5404.7[&] 4	100[&]	896.28	7/2−			
6382.0		5485.6[&] 6	100[&]	896.28	7/2−			
6392		6392[‡a] 8	100[#]	0.0	9/2−			
6556.1		6556[‡a]	100[#]	0.0	9/2−			
6712.2		5815.8[&] 4	100[&]	896.28	7/2−			
6900.5		6004.1[&] 7	100[&]	896.28	7/2−			
6911?	(7/2,9/2,11/2)	6911[‡af] 4	100[#]	0.0	9/2−			
6944.8	(7/2,9/2,11/2)	6944.7[@] 21	100[@]	0.0	9/2−			
6983	(7/2,9/2,11/2)	6983[‡a] 4	100[#]	0.0	9/2−			
7106?	(7/2,9/2,11/2)	7106[‡af] 4	100[#]	0.0	9/2−			
7168.1	9/2+	7168[‡a]	100[#]	0.0	9/2−	E1		B(E1)(W.u.)=0.00093 5 α(IPF)=0.00256 4 Mult.: from $\gamma(\theta)$ and γ(pol) in (γ,γ'), δ<0.05 if J(7168)=9/2 and −0.1 if J(7168)=11/2.
7171	(7/2,9/2,11/2)	7171[‡a] 4	100[#]	0.0	9/2−			
7176.6	(7/2,9/2,11/2)	7176.5[@] 10	100[@]	0.0	9/2−			

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Adopted Levels, Gammas (continued)

γ(^{209}Bi) (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f	Mult.[b]	Comments
7202	11/2$^+$,13/2$^+$	7202[‡af] 5	100[#]	0.0	9/2$^-$		
7243.9	(7/2,9/2,11/2)	7243.8[@] 13	100[@]	0.0	9/2$^-$		
7264	(7/2,9/2,11/2)	7264[‡a] 4	100[#]	0.0	9/2$^-$		
7279.1		7279.0[‡a]	100[#]	0.0	9/2$^-$		
7279+x		6382[‡a]	[#]				
		7279[‡a]	[#]				
7287	(7/2,9/2,11/2)	7287[‡a] 4	100[#]	0.0	9/2$^-$		
7360	(7/2,9/2,11/2)	7360[‡a] 4	100[#]	0.0	9/2$^-$		
7416.1	9/2$^-$	7416[‡a]	100[#]	0.0	9/2$^-$	(D)	Mult.: A_2=+0.20 3 (1969Ra09) in (γ,γ').
7632.1	(9/2$^+$)	7632[‡a]	100[#]	0.0	9/2$^-$	(D)	Mult.: A_2=+0.24 4 (1974Wo05) in (γ,γ').

[†] Weighted averages of values from (t,2nγ) and (n,n$'\gamma$), unless otherwise noted. Energies without uncertainties are from level-energy differences.
[‡] Weighted average of values from (t,2nγ), (n,n$'\gamma$) and Coulomb excitation.
[#] From (t,2nγ).
[@] From (n,n$'\gamma$).
[&] From (^{3}He,dγ).
[a] From (γ,γ').
[b] From $\gamma(\theta)$ in (t,2nγ) (1983Ma15), unless otherwise noted.
[c] Excitation in (γ,γ') is probably D (or D+Q) based on the measured values of $g\Gamma(\gamma_0)^2/\Gamma$, which leads to unexpected large B(E2)(W.u.)>10 and rules out the possibilities of pure quadrupole transitions.
[d] Additional information 3.
[e] If No value given it was assumed δ=0.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
[f] Placement of transition in the level scheme is uncertain.

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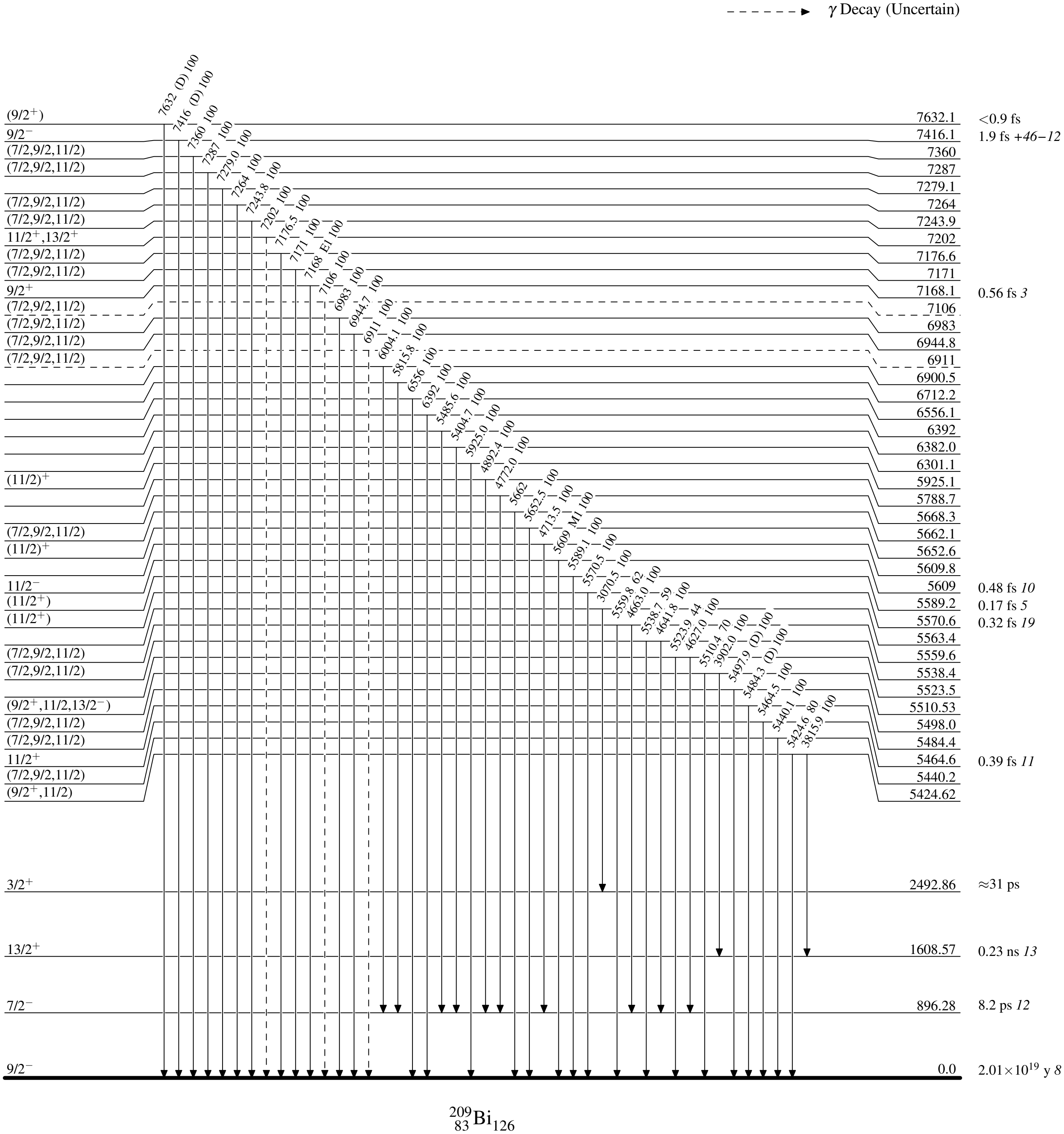
Adopted Levels, Gammas

Legend

Level Scheme

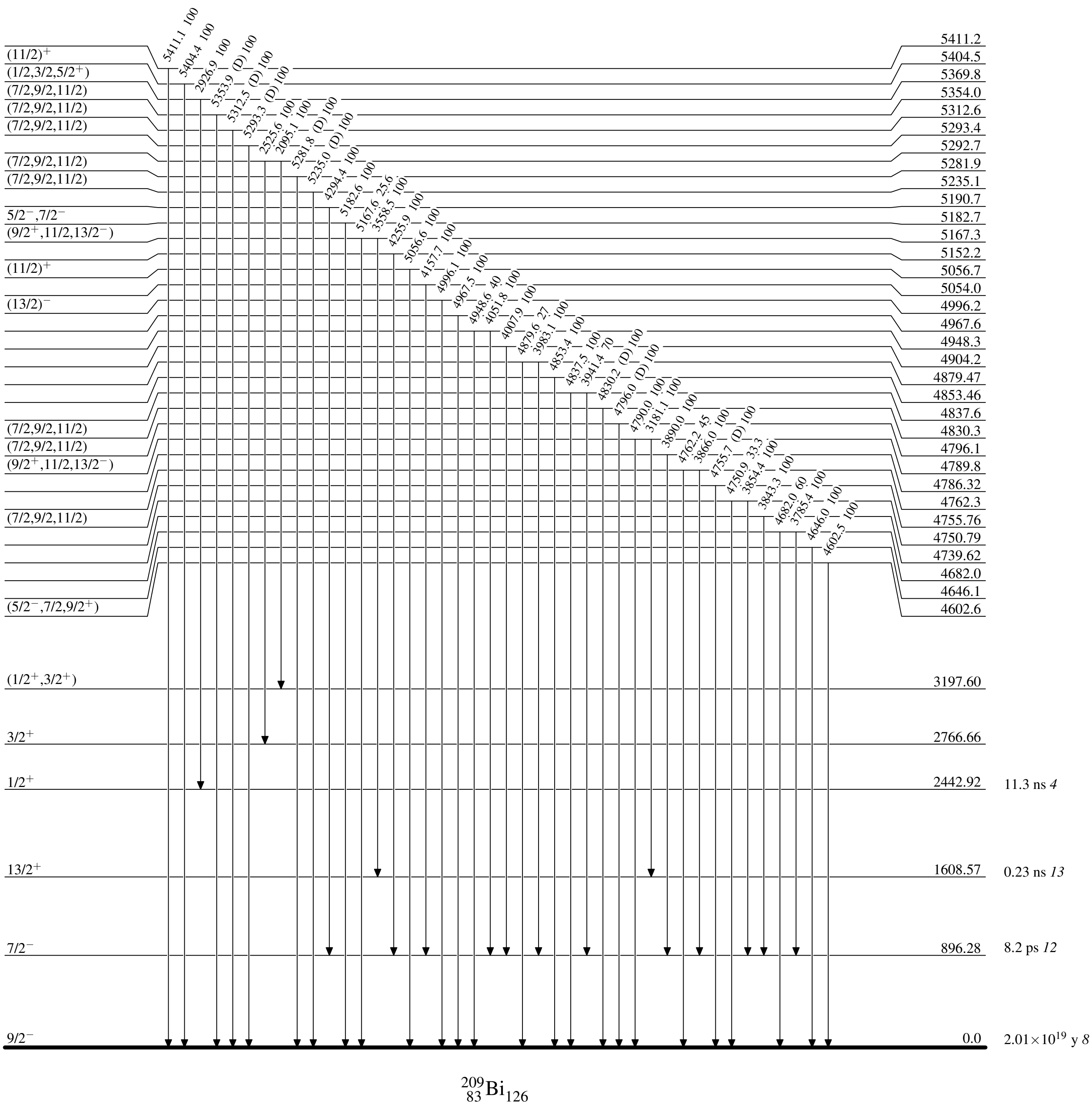
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

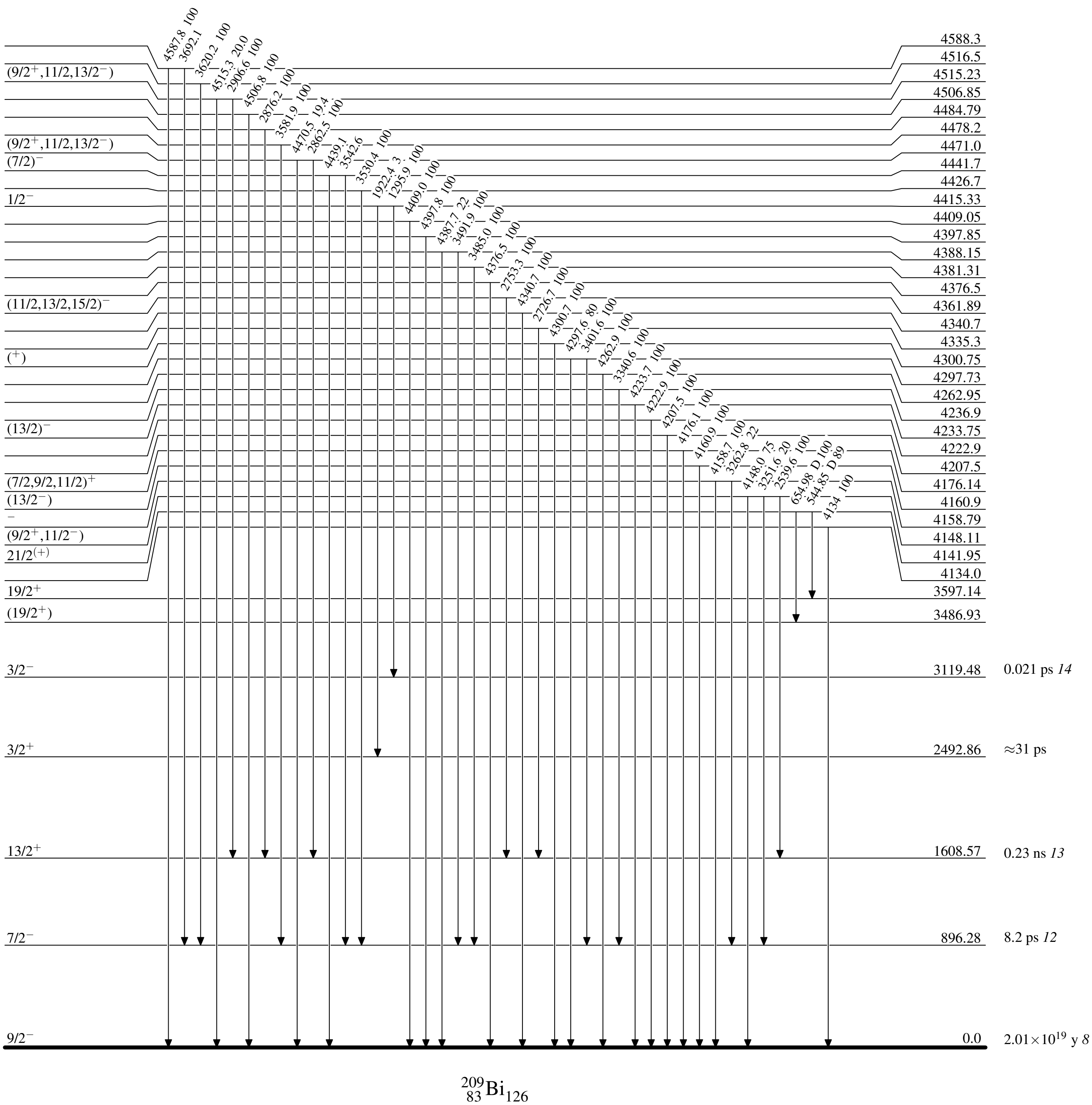
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

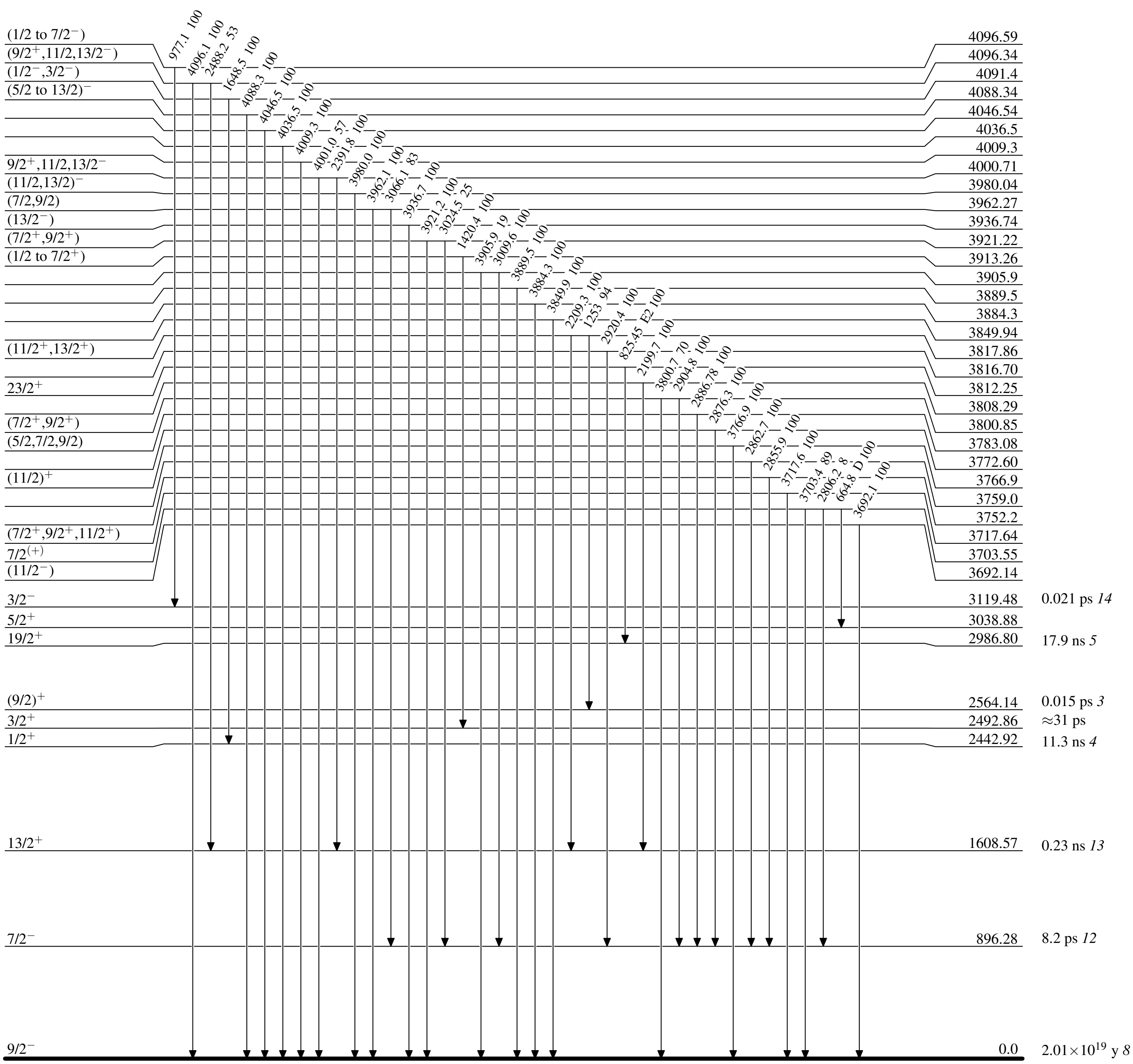
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{209}_{83}Bi_{126}$

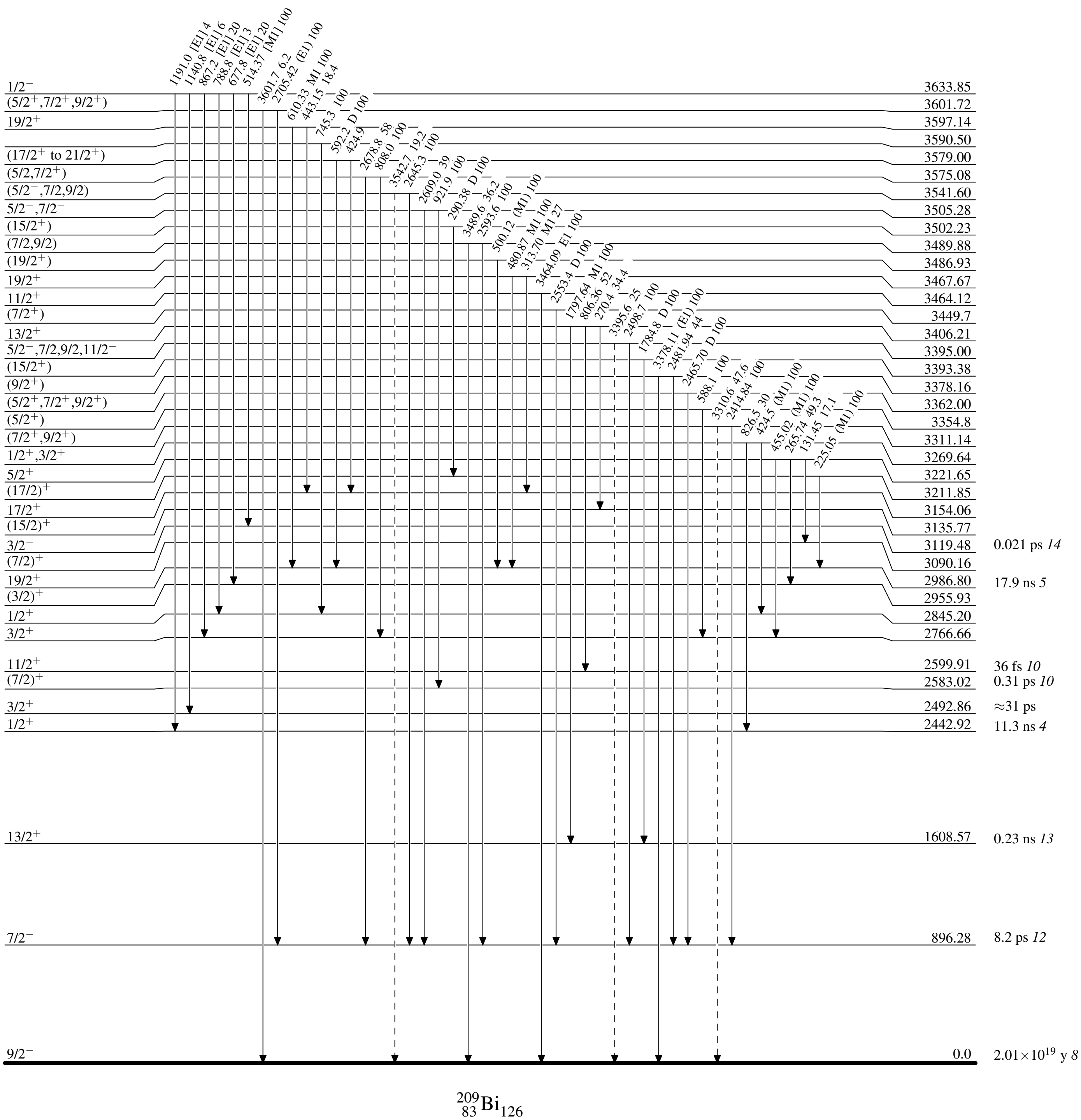
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



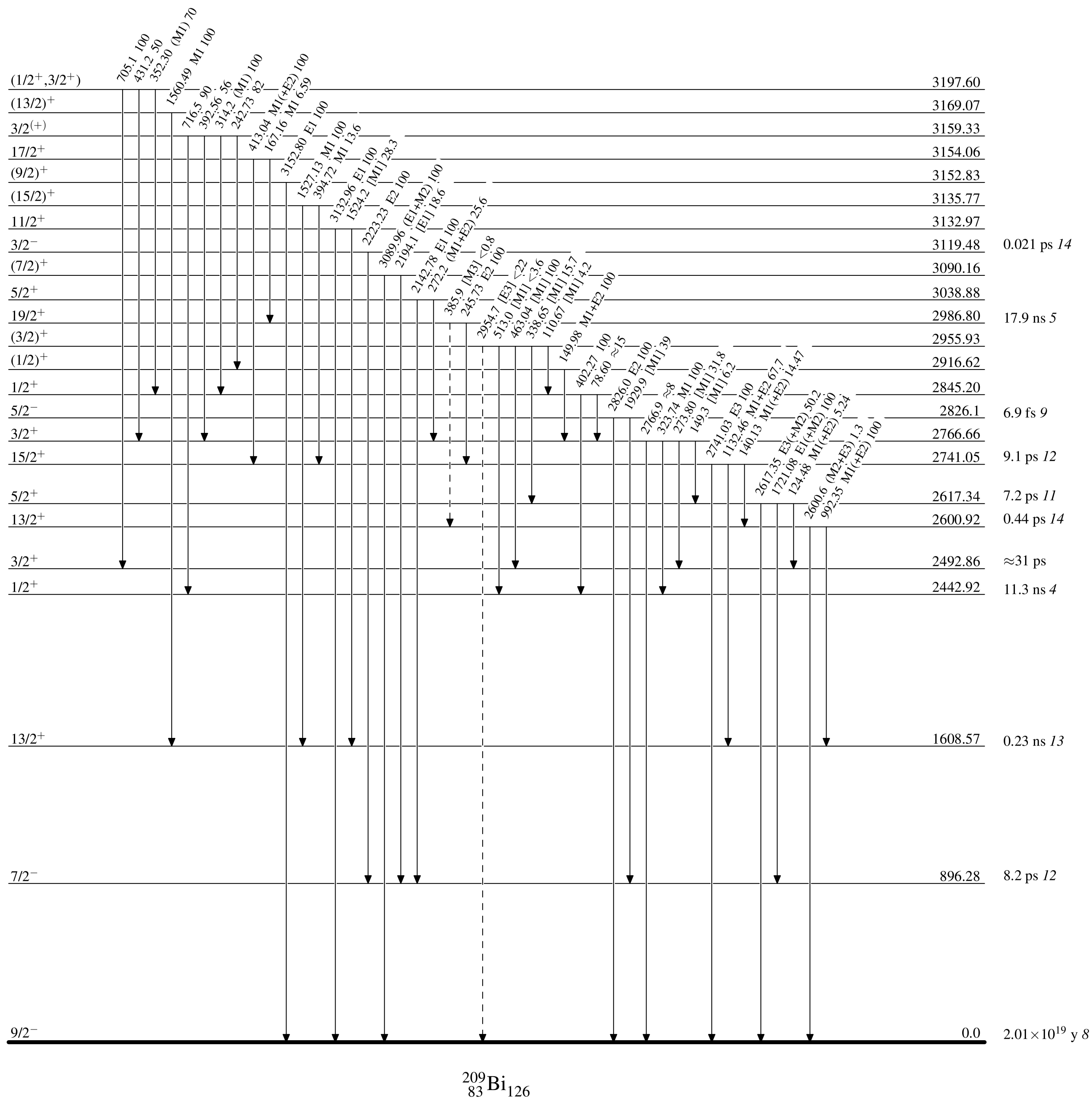
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level