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

 $Q(\beta^{-})=-280.95$; S(n)=10159.3 14; S(p)=7506.5 14; Q(\alpha)=-6485.620 2021Wa16 S(2n)=18051.6 14, S(2p)=18919 5 (2021Wa16). Other Reactions.

Br(γ, γ'): photoexcitation of 35- μ s 536 level via intermediate structures at 3.45 MeV 15 (1990Po07) and at 4.80 MeV 15 (1993Du10).

2015Al19: Isotopic yield cross section $\sigma(^{81}Br)=0.125$ mb 17, in spallation of ^{136}Xe -induced reactions on deuterium at 500 MeV/nucleon.

⁸¹Br Levels

Cross Reference (XREF) Flags

| | | $ \begin{array}{c} \mathbf{A} & {}^{81}\mathrm{Se}\beta \\ \mathbf{B} & {}^{81}\mathrm{Se}\beta \\ \mathbf{C} & {}^{81}\mathrm{Kr}\varepsilon \\ \mathbf{D} & {}^{81}\mathrm{Kr}\varepsilon \end{array} $ | ⁻ decay (18.5 min) ⁻ decay (57.28 min) decay (2.13×10 ⁵ y) decay (13.10 s) | E ${}^{80}Se(p,\gamma)$ I ${}^{80}Se(\alpha,p2n\gamma),{}^{78}Se(\alpha,p\gamma)$ h) F ${}^{80}Se(p,p),(p,n)$ IAR J ${}^{81}Br(n,n'\gamma)$ c) G ${}^{80}Se(d,n\gamma)$ K ${}^{81}Br(p,p'\gamma)$ H ${}^{80}Se({}^{3}He,d)$ L Coulomb excitation | | | | | | |
|-------------------------|-----------|---|--|--|---|---|--|--|--|--|
| E(level) [†] | J^{π} | T _{1/2} ^{<i>a</i>} | XREF | | | (| Comments | | | |
| 0.0 ^d | 3/2- | stable | ABCDE GHIJKL | $\begin{array}{l} \mu = +2.2686\ 6\\ Q = +0.2579\ 2\\ Octupole\ mom(mag) = +0.129\\ < r^2 >^{1/2}(charge) = 4.1599\ fm\ 21\ (2013An02).\\ J^{\pi}:\ 3/2\ from\ hyperfine\ splitting\ (1930Br01,1954Ki11);\ L(^{3}He,d) = 1.\ (\pi\ p_{3/2})\ configuration\ dominant\ (1996Ja09).\\ \mu:\ from\ NMR\ (2019StZV,\ from\ 1972Bl07).\ Their\ earlier\ value\\ \mu = 2.262612\ 4\ (1970Bl08).\ g(^{81}Br)/g(^{79}Br) = 1.0779355\ 3\ (1970Lu02).\\ Q:\ from\ 2021StZZ,\ 2018Py01,\ 2013Ch52\ (Atomic\ Beam).\ Others:\ +0.2615\ 25\ (2001Bi17\ -\ (reassessment\ of\ atomic\ beam\ data\ from\ 1954Ki11)),\\ +0.266\ 4\ (2004Al08,\ erratum)\ and\ +0.254\ 6\ (2000Ha64),\ +0.276\ 4\ (1989Ra17\ from\ 1978Ta24;\ 1998Se09);\ all\ reassessments\ of\ atomic\ beam\ data\ of\ 1954Ki11.\ Sternheimer\ correction\ included.\\ Q(^{79}Br)/Q(^{81}Br) = 1.1970568\ 15\ (1969He04).\\ Octavelar match arguments in expression (100CD\ 02).\\ \end{array}$ | | | | | | |
| 275.986 ^d 9 | 5/2- | 9.7 ps <i>14</i> | ABC E GHIJKL | $\mu = 1.6 \mu = 1.6 J^{\pi} : L(^{3}) (199) T_{1/2} : f from 1974 adop \mu: from correct for the second s$ | ⁵ (He,d)=3, M1+E2 275 (6Ja09). rom DSAM in Coulon a 290y-276 γ (t) in ⁸¹ Se (LiZL), 10 ps 6 from H ted transition propertien n (2020StZV, 1996Ja0) elation in Coulomb exc | γ to $3/\beta^{-}$ de β^{-} de $\beta(E2)\uparrow$ es. Θ) transition | 2^{-} . (π f _{5/2}) dominates configuration itation (1996Ja09). Others: 235 ps 15 ecay (18.5 min) (1974SaYH, =0.0508 25 in Coulomb excitation and usient field integral perturbed angular n and adopted J. | | | |
| 536.291 [°] 15 | 9/2+ | 36 µs 3 | B E GHIJ | $\mu = 5.70 5$ $J^{\pi}: M2 \gamma \text{ to } 5/2^{-}. \text{ L}(^{3}\text{He,d}) = 4+1 \text{ for } (536+538) \text{ doublet; this level is presumed to be the L=4 component since $\pi = +$ based on γ-decay mode. (π g_{9/2}$) configuration dominant (1996Ja09). T1/2: weighted average of 35 μs 9 and 40 μs 10 from 1967Iv03 (different reactions), 46 μs 7 (1968Iv02), 32 μs 3 (1971Ch28), 37 μs 3 (1958Du80 - γ(t) - authors speculated T_{1/2} could be either of ^{79}Br or ^{81}Br - the evaluator considers it is for the latter isotope - produced by (γ,γ')).$ | | | | | | |

Continued on next page (footnotes at end of table)

⁸¹Br Levels (continued)

| E(level) [†] | J^{π} | $T_{1/2}^{a}$ | | XREF | Comments | | | | |
|---|---|------------------|---|-----------|--|--|--|--|--|
| | | | | | μ : stroboscopic perturbed angular distribution [2020StZV, from 1972Ch34 (does not include Knight-shift corrections) – authors other article report g-factor=1.261 <i>10</i> (1971Ch28) yields μ =5.675 <i>45</i>]. Absolute μ =5.84 7 from measured g-factor=1.297 <i>15</i> (1971Br31). | | | | |
| 538.194 <i>14</i> | 1/2 ⁻ ,3/2 ^{-&} | 0.76 ps <i>3</i> | A | E GH JKL | J ^{π} : M1+E2 γ to 3/2 ⁻ . L(³ He,d)=4+1 for (536+538) doublet; this level presumed to be the L=1 component since π =- from γ -decay mode. J=1/2 favored by excit in (d,n γ). | | | | |
| 566.124 9 | 3/2- | 68 ps +32-18 | A | E G IJ L | J ^π : E2+M1 γ to 5/2 ⁻ and 3/2 ⁻ ; log <i>ft</i> =6.4 from 1/2 ⁻ in ⁸¹ Se β ⁻ decay (18.5 min). T _{1/2} : 68 ps +32-18 if δ (566γ)=-3.0 5; 0.5 ps 13-5 if δ (566γ)=-0.08 5 (however, see comment on δ from (p,γ) for 566γ). | | | | |
| 650.003 16 | (3/2) ^{-&} | 2.6 ps 3 | A | EGHJL | J ^{π} : 1/2 ⁻ ,3/2 ⁻ from L(³ He,d)=1 and J=(3/2,5/2) from $\gamma(\theta)$ measurements in (p, γ). | | | | |
| 767.04 10 | (5/2)-& | 0.54 ps 4 | В | E GH JKL | μ =1.0 4 J ^{π} : M1+E2 γ to 3/2 ⁻ and 5/2 ⁻ ; absence of β ⁻ branch from 1/2 ^{- 81} Se. | | | | |
| 789.258 19 | 5/2+ | | В | E GH | (2020StZV, 1996Ja09) in Coulomb excitation and adopted J. XREF: H(792.5). J^{π} : L(³ He,d)=2; J=5/2 from $\gamma(\theta)$ in (d,n γ). | | | | |
| 828.434 15 | 3/2- | 0.46 ps 7 | A | EGHJL | E(level): $792.5 \ 27$ from ("He,d). XREF: H(832.4). J^{π} : L(³ He,d)=1: M1+E2 γ to $5/2^{-}$. | | | | |
| 836.82 ^d 10 | 7/2 ^{-&} | 1.05 ps 7 | Α | E G IJKL | μ =1.4 4 J^{π} : direct excitation in Coulomb excitation of 3/2 ^{- 81} Br; $\gamma(\theta)$ in (p, γ); E2, Δ J=2, γ to 3/2 ⁻ . T _{1/2} : from Coulomb excitation (DSAM and B(E2)). μ : from transient field integral perturbed angular correlation (2020StZV, 1996Ja09) in Coulomb excitation and adopted J. | | | | |
| 906 <i>13</i> 975 <i>15</i> | | | | E | | | | | |
| 1023.7 4 | 5/2 ⁽⁻⁾ | | | EG JK | J ^{π} : D 458 γ to 3/2 ⁻ 566; Q 485 γ to 1/2 ⁻ ,3/2 ⁻ 538; π from excit in (d,n γ). | | | | |
| 1076.2? 7 | | | | J | E(level): level shown as tentative because the transitions involved are weak and/or might also be placed elsewhere in ⁷⁹ Br or ⁸¹ Br level schemes. | | | | |
| 1105.3 6 | (1/2) ⁻ | | A | E GH J | J^{π} : L(³ He,d)=1; J=1/2 favored by $\gamma(\theta)$ and excit in (d,n γ). E(level): from E γ in (d,n γ). E=1105 2 in (n,n' γ) for tentative level. | | | | |
| 1170 <i>15</i> 1176.90 ^c 20 | $(13/2)^+$ | | | E GI | J ^{π} : stretched E2 641 γ to 9/2 ⁺ ; band assignment; excit in | | | | |
| 1189.9 <i>21</i> 1237.88 <i>10</i> | 5/2-,7/2- | | | H EGJK | J^{π} : L(³ He,d)=3. J^{π} : γ to 3/2 ⁻ and 5/2 ⁻ , so J<(7/2). | | | | |
| 1266.4 ^{<i>d</i>} 3 | 9/2 ⁽⁻⁾ | | | GI | J^{π} : stretched Q intraband 990 γ to 5/2 ⁻ 276; D+Q 430 γ to 7/2 ⁻ 837. | | | | |
| 1266.9 <i>6</i> 1300 <i>15</i> | (3/2 ⁻ ,5/2,7/2 ⁻) | | | J E | J^{π} : γ to 3/2 ⁻ and 7/2 ⁻ . | | | | |
| 1323.0 4 | (5/2)- | ≤0.31 ps | | GHJL | XREF: H(1325.7). J^{π} : L(³ He,d)=3 for level at 1325.7 <i>19</i> which evaluator presumes to be this level since energy scale in (³ He,d) is | | | | |

Continued on next page (footnotes at end of table)

⁸¹Br Levels (continued)

| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | E(level) [†] | J^{π} | | XRE | F | Comments |
|--|-------------------------------|---------------------------|---|------|-----|--|
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | | | typically several keV high: 1323γ to $3/2^{-1}$ g.s.: 486γ to $7/2^{-1}$ 837: J=5/2 from |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | | | excit in (d,ny), consistent with $\gamma(\theta)$. |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | | | $T_{1/2}$: from measured B(E2) in Coulomb excitation and adopted branching, |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | | | assuming $J=5/2$. |
| $ \begin{array}{rcl} 149.8 \ 5 & \mbox{E} & \mbox{E} & \mbox{E} & \mbox{J} & $ | 1327.3 4 | | Α | Е | | J^{π} : γ to $(5/2)^{-}$ and $(3/2)^{-}$, so $J \leq (7/2)$. |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1349.8 5 | | | E | JK | J^{π} : γ to $3/2^{-}$ and $(5/2)^{-}$, so $J \leq (7/2)$. |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1371.4 10 | $7/2^{+}$ | | GI | н | XREF: H(1375.7). |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | | | E(level): other: 1375.7 29 (³ He,d). |
| $ \begin{array}{rcl} 400.97 \ lower lower$ | | | | | | J^{π} : L(³ He.d)=4; D(+O) 582 γ to 5/2 ⁺ 789. |
| $ \begin{array}{rcl} 1481.8 & 6 & (7/2^-) & C & J^{F_1} (D^+Q) 7(4/6^{\gamma_1} to (5/2)^{-7} 67; 915.7 to 3/2^{-5} 566; excit in (d,ny). \\ 1513.0 70 & (1/2^{-3}/2^{-7}) & E & J^{F_1} (D^+Q) 7(4/6^{\gamma_1} to (5/2)^{-7} 67; 915.7 to 3/2^{-5} 566; excit in (d,ny). \\ 1535.0 5 & J^{F_1} (D^+Q) 986 \gamma to 9/2^{+} 536; y to (13/2)^{+} 1177; excit in (d,ny). \\ 1535.0 5 & J^{F_1} (D^+Q) 986 \gamma to 9/2^{+} sol 5(7/2), \\ 1535.0 5 & J^{F_1} (D^+Q) 7(4/2^{+} sol 5(7/2), \\ 1535.0 5 & J^{F_1} (D^+Q) 7(4/2^{+} sol 5(7/2), \\ 1545.1 5 J^{O_1} (D^+Q)^{-1} & e & G & J^{F_1} (D^+Y) 5/2^{-2} (xcit in (d,ny)). \\ 1545.1 5 J^{O_1} (D^+Q)^{-1} & e & G & J^{F_1} (D^+Y) 5/2^{-2} (xcit in (d,ny)). \\ 1545.3 5 & J^{O_2} (D^+Q)^{-1} (D^+Q) J^{O_2} 783 dn 7/5\gamma to 5/2^{-2} 767; 90.5 (27/2). L(^3 He,d)=1 for a \\ 1545.4 Sci J^{O_2} (D^+Q)^{-1} J & J^{F_1} (D^+Q) J^{O_2} Sci dn D1267.2\gamma to 5/2^{-2} 767; 706.6 \gamma to 7/2^{-2} 837; excit in (d,ny). \\ 1545.4 Sci J^{O_2} (D^+Q)^{-1} J & J^{F_1} (D^+Q) J^{O_2} Sci J^{O_2} J^{O_2}$ | 1400.9? 10 | | | Е | J | J^{π} : possible γ to $3/2^{-}$ g.s. |
| $ \begin{array}{rcl} 1513.0 & (1/2^{-}3/2^{-}) & \mathbf{E} \in \mathbf{G} & \mathbb{P}^{2} : \operatorname{from}^{2}(\theta) \text{ and excit in } (d.ny). \ by (b 3/2^{-}, b) & (1/2^{+}) \\ 1522.4 & (1/2^{+}) & \mathbf{G} & \mathbb{P}^{2} : \mathrm{D} + \mathrm{O} 98(5 to 93/2^{-} 8.5; \mathbf{J} = 3/2 \ \mathrm{from} \operatorname{excit} in \ (d.ny). \\ 1535.9 & (3/2^{-}) & \mathbf{e} \in \mathbf{J} & \mathbb{P}^{2} : \mathrm{D} to 3/2^{-} \ \mathrm{sol} \ 5/2(7/2). \\ 1535.9 & \mathbf{I} & (3/2^{-}) & \mathbf{I} & \mathbf{G} & \mathbb{P}^{2} : \mathrm{D} to 3/2^{-} \ \mathrm{sol} \ 5/2(7/2). \\ 1543.0 & \mathbf{E} & \mathbf{I} \\ 1543.0 & \mathbf{E} & \mathbf{I} \\ 1543.0 & \mathbf{E} & \mathbf{I} \\ 1543.0 & \mathbf{E} & \mathbf{I} \\ 1543.2 & \mathbf{I} & (3/2^{-}) & \mathbf{E} & \mathbf{G} & \mathbb{P}^{2} : \mathbf{D} \ 977.0 \ \mathrm{to} \ 3/2^{-} \ 828 \ \mathrm{an} \ 775 \ \mathrm{to} \ 5/2^{-} \ 767, \ \mathrm{so} \ 1_{\mathbf{Z}}(7/2). \ \mathbf{L}^{3} \ \mathrm{He}, 0 = 1 \ \mathrm{fr} & \mathbf{I} \ 1_{\mathbf{I}}^{3} \ \mathrm{He}, \mathbf{I} \ \mathrm{I} \ \mathbf{I} & \mathbf{I} & \mathbf{I} & \mathbf{I} & \mathbf{I} \ \mathbf{I} & \mathbf{I} & \mathbf{I} & \mathbf{I} \ \mathbf{I}$ | 1481.8 6 | $(7/2^{-})$ | | G | | J^{π} : D(+Q) 714.6y to $(5/2)^{-}$ 767; 915.7y to $3/2^{-}$ 566; excit in (d,ny). |
| $ \begin{array}{llllllllllllllllllllllllllllllllllll$ | 1513.0 10 | $(1/2^{-}, 3/2^{-})$ | | ΕG | | J^{π} : from $\gamma(\theta)$ and excit in (d,n γ). D γ to $3/2^{-}$. |
| $ \begin{array}{llllllllllllllllllllllllllllllllllll$ | 1522.4 8 | $(11/2^+)$ | | G | | J^{π} : D+Q 986 γ to 9/2 ⁺ 536; γ to (13/2) ⁺ 1177; excit in (d,n γ). |
| 1536.0 5 e J $F: y \text{ to } 3/2^- \text{ and } 5/2^-, \text{ so } 1_2(7/2).$ 1541.5 10 (9/2 ⁺) e G $F: Q \text{ y to } 5/2^-, \text{ soci in } (d,ny).$ 1543.6 6 e h J $F: 15/y \text{ to } 3/2^- \text{ Sol } 28 \text{ and } 75y \text{ to } (5/2)^- 767, \text{ so } J_2(7/2). L^3 He,d)=1 \text{ for a } 1545.keV level.$ 1543.2 5 (3/2 ⁻) e Gh $F: 0 \text{ pr} 0, y \text{ to } 3/2^- 56 \text{ and D } 1267.2y \text{ to } 5/2^- 276; 706.6y \text{ to } 7/2^- 837; excit in (d,ny). L^3 He,d)=1 for a 1545.keV level. 1586.8 10 1/2+ GH F: y \text{ to } 3/2^- \text{ and } 5/2^-, \text{ so } 1_2(7/2). 1587.4 7 J J2: v to 3/2^- \text{ and } 5/2^-, \text{ so } 1_2(7/2). 1615 15 E J F: y \text{ to } 3/2^- \text{ and } 5/2^-, \text{ so } 1_2(7/2). 1681.2 8 (7/2-) G J2: y to 3/2^- \text{ and } 5/2^-, \text{ so } 1_2(7/2). 1788.7 10 (J/2+) G J2: y to 3/2^- \text{ and } 5/2^-, \text{ so } 1_2(7/2). 1680.4 0 (3/2+) E JK J2: y to 3/2^- \text{ and } 5/2^-, \text{ so } 1_2(7/2). 1788.7 10 (J/2+) G J2: y to 3/2^- \text{ and } 7/2^ Tsoc y and 7/2^ 1788.7 10 (J/2+) G J2: y to 3/2^- \text{ for y cot in } (d,ny). 1$ | 1535.9 7 | $(3/2^{-})$ | | e G | | J^{π} : D 1536 γ to 3/2 ⁻ g.s.; J=3/2 from excit in (d,n γ). |
| Level assumed to differ from 1535.9 level in (d,ny) because γ branching differs significantly, 1541.5 10 (9/2 ⁺) e G J ^z ; Q γ to 5/2 ⁺ ; excit in (d,ny). 1543.0 6 e h J J ^z ; T15 γ to 3/2 ⁻ 828 and 775 γ to (5/2) ⁻ 767, so J \leq (7/2). L(³ He,d)=1 for a 1545-keV level. 1543.2 5 (3/2 ⁻) e G H J ^z ; D 977.0 γ to 3/2 ⁻ 566 and D 1267.2 γ to 5/2 ⁻ 276; 706.6 γ to 7/2 ⁻ 837; excit in (d,ny). L(³ He,d)=1 for a 1545-keV level. 1587.4 7 J J ^z ; L(³ He,d)=1 for a 1545-keV level. 1587.4 7 J J ^z ; γ to 3/2 ⁻ and 5/2 ⁻ , so J \leq (7/2). 1615 15 E JK J ^z ; γ to 3/2 ⁻ and 5/2 ⁻ , so J \leq (7/2). 1615 15 E JK J ^z ; γ to 3/2 ⁻ and 5/2 ⁻ , so J \leq (7/2). 1616 2.8 (7/2 ⁻) G J ^z ; γ to 3/2 ⁻ and 5/2 ⁻ , so J \leq (7/2). 1617 3 E JK J ^z ; γ to 3/2 ⁻ and 5/2 ⁻ , so J \leq (7/2). 1618 2.8 (7/2 ⁻) G J ^z ; γ to 3/2 ⁻ and 5/2 ⁻ , so J \leq (7/2). 1618 2.8 (7/2 ⁻) G J ^z ; γ to 3/2 ⁻ 789; excit in (d,ny). 1751.5 10 E G J ^z ; γ to 7/2 ⁻ 180; excit in (d,ny). 1798.9 10 (5/2 ⁻) G J ^z ; γ to 7/2 ⁻ 837; D(+Q) for 9/2 ⁻ 786; 1788.7 10 (7/2 ⁺) G J ^z ; γ to 3/2 ⁻ and 7/2 ⁻ . 1788.7 10 (7/2 ⁺) G J ^z ; γ to 3/2 ⁻ and 7/2 ⁻ . 1788.7 (3/2 ⁻ ,5/2,7/2 ⁻) e G J ^z ; γ to 3/2 ⁻ and 7/2 ⁻ . 1945.6 ^d 4 11/2 ⁽⁻⁾ G I J ^z ; stretched Q 1108.8 γ to 7/2 ⁻ 837; D(+Q) 679 γ to 9/2 ⁽⁻⁾ 1266.4; possible band assignment. 1948.3 13 (9/2) ⁺ E G II J ^z ; γ to 3/2 ⁻ and 7/2 ⁻ . 1945.6 ^d 4 11/2 ⁽⁻⁾ G I J ^z ; tretched Q 1108.8 γ to 7/2 ⁻ 837; D(+Q) 679 γ to 9/2 ⁽⁻⁾ 1266.4; possible band assignment. 1948.3 13 (9/2) ⁺ E G J ^z ; D (1028 γ to 7/2 ⁻ 837; D(+Q) 679 γ to 9/2 ⁽⁻⁾ 1266.4; possible band assignment. 1948.3 13 (9/2) ⁺ E G J ^z ; D (128 γ to 5/2 ⁺ 789; excit in (d,ny). 2055.9 [#] 21 (2 ⁻ ,3/2 ⁻ E H J ^z ; L(³ He,d)=1. 1955.9 [#] 21 (2 ⁻ ,3/2 ⁻ E H J ^z ; L(³ He,d)=1. 117.9 10 3/2 ⁺ ,5/2 ⁺ G II J ^z : L(³ He,d)=1. 216.4, I [#] 22 1/2 ⁻ ,3/2 ⁻ E H J ^z ; L(³ He,d)=1. 217.9 ⁻ 11 (172 ⁺) G I I ^z 7 γ to 13/2 ¹ . Band assignment favors (17/2 ⁺). | 1536.0 5 | | | e | J | J^{π} : γ to $3/2^{-}$ and $5/2^{-}$, so $J \leq (7/2)$. |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | | | Level assumed to differ from 1535.9 level in $(d,n\gamma)$ because γ branching differs |
| | | | | | | significantly. |
| 1543.0 6 e h J J^{\pm} ; 715y to J^{2-} 828 and 775y to $(5/2)^{-}$ 767, so $J \leq (7/2)$. $L^{3}He,d)=1$ for a 1543.2 5 1543.2 5 $(3/2^{-})$ e Gh J^{\pm} ; D 977, by to $3/2^{-}$ 566 and D 1267.2 y to $5/2^{-}$ 276; 706.6 y to $7/2^{-}$ 837; excit in (d,ny) . $L^{3}He,d)=1$ for a 1545-keV level. 1586.8 10 $I/2^{+}$ GH J^{\pm} ; y to $3/2^{-}$ and $5/2^{-}$, so $J \leq (7/2)$. 1587.4 7 J J^{\pm} ; y to $3/2^{-}$ and $5/2^{-}$, so $J \leq (7/2)$. 1615 15 E 1630.7 3 E JK J^{\pm} ; y to $3/2^{-}$ and $5/2^{-}$, so $J \leq (7/2)$. 1688.1 2 8 $(7/2^{-})$ G J^{\pm} ; y to $3/2^{-}$ 780; excit in (d,ny) . 1751.5 10 E G J^{\pm} ; p to $7/2^{-}$ 789; excit in (d,ny) . 1788.7 10 C (3/2^{-}) G J^{\pm} ; y to $3/2^{-}$ 1024; excit in (d,ny) . 1788.7 10 G I J^{\pm} ; y to $3/2^{-}$ 767; J=5/2 from excit in (d,ny) . 1885.3 (3) $(3/2^{-})$ e G J^{\pm} ; y to $3/2^{-}$ and $7/2^{-}$. 1985.9 A^{-} $(3/2^{-}, 5/2, 1/2^{-})$ e G J^{\pm} ; tretched Q 1108.8 y to $7/2^{-}$ 837; D(+Q) 679 y to $9/2^{(-)}$ 1266.4; possible band assignment. 1985.2 6 $3/2^{+}, 5/2^{+}$ e H | 1541.5 <i>10</i> | $(9/2^+)$ | | e G | | J^{π} : Q γ to $5/2^+$; excit in (d,n γ). |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1543.0 6 | | | e l | h J | J ^{π} : 715 γ to 3/2 ⁻ 828 and 775 γ to (5/2) ⁻ 767, so J≤(7/2). L(³ He,d)=1 for a |
| | | | | | | 1545-keV level. |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1543.2 5 | $(3/2^{-})$ | | e Gl | h | J^{π} : D 977.0 γ to 3/2 ⁻ 566 and D 1267.2 γ to 5/2 ⁻ 276; 706.6 γ to 7/2 ⁻ 837; excit |
| $ \begin{array}{llllllllllllllllllllllllllllllllllll$ | | | | | | in $(d,n\gamma)$. L(³ He,d)=1 for a 1545-keV level. |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1586.8 10 | $1/2^{+}$ | | GI | н | J^{π} : L(³ He,d)=0; γ to 5/2 ⁺ . |
| $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | | , | | | | E(level): from (³ He.d). |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1587.4 7 | | | | J | J^{π} : γ to $3/2^{-}$ and $5/2^{-}$, so $J < (7/2)$. |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1615 15 | | | Е | - | |
| $ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | 1670.7 3 | | | Е | ЈК | J^{π} : γ to $3/2^{-}$ and $5/2^{-}$, so J<(7/2). |
| $ \begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1681.2.8 | $(7/2^{-})$ | | G | | J^{π} : D(+O) γ to $5/2^{(-)}$ 1024: excit in (d.n γ). |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1696.0 10 | $(3/2^+)$ | | EG | | J^{π} : D 907v to 5/2 ⁺ 789: excit in (d.nv). |
| $ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | 1751.5 10 | (0/=) | | ΕG | | J^{π} : γ to $7/2^{-}$. |
| 1798.9 10 $(5/2^{-1})$ G $J^{\pi}: D \ 1032\gamma \ to \ (5/2)^{-7} \ 767; J=5/2 \ from excit in (d,ny).$ 1866.4 10 $(3/2^{-})$ e G $J^{\pi}: 3/2^{-7} \ from excit in (d,ny); isotropic 1030\gamma \ to 7/2^{-836.}$ 1885.3 7 $(3/2^{-},5/2,7/2^{-})$ e G $J^{\pi}: \gamma \ to 3/2^{-} \ and 7/2^{}$ 1945.6 ^d 4 $11/2^{(-)}$ G I $J^{\pi}: \text{stretched Q } 1108.8y \ to 7/2^{-837;} \ D(+Q) \ 679\gamma \ to 9/2^{(-)} \ 1266.4; \ possible band assignment. 1948.3 13 (9/2)^{+} E GH J^{\pi}: L(^{3}\text{He},d)=4; \ D \ 425.9\gamma \ to \ (11/2^{+}) \ 1522. 1985.2 26 3/2^{+}, 5/2^{+} e H E(level): from (^{3}\text{He},d). J^{\pi}: L(^{3}\text{He},d)=2. I^{\pi}: D(+Q) \ 729\gamma \ to 9/2^{(-)} \ 1266.4; \ D+Q \ 972\gamma \ to 5/2^{(-)} \ 1023. 2000.4 11 G J^{\pi}: D \ 1233\gamma \ to 5/2^{+} \ 789; \ excit in \ (d,n\gamma). 2055.9 \# \ 21 1/2^{-}, 3/2^{-7} E H J^{\pi}: L(^{3}\text{He},d)=1. 2085 4 7/2^{+}, 9/2^{+} H J^{\pi}: L(^{3}\text{He},d)=2. I^{\pi}: L(^{3}\text{He},d)=2. 217.9 10 3/2^{+}, 5/2^{+} GH XREF: H(2122.5). I(n) I^{\pi}: L(^{3}\text{He},d)=1. 217.9 4 H J^{\pi}: L(^{3}\text{He},d)$ | 1788.7 10 | $(7/2^+)$ | | G | | J^{π} : D+O 999 γ to 5/2 ⁺ 789; excit in (d.n γ). |
| $\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$ | 1798.9 10 | $(5/2^{-})$ | | G | | J^{π} : D 1032 γ to $(5/2)^{-}$ 767; J=5/2 from excit in (d,n γ). |
| 1885.3 7 $(3/2^-, 5/2, 7/2^-)$ e G J^{π} : γ to $3/2^-$ and $7/2^-$. 1945.6 ^d 4 $11/2^{(-)}$ G I J^{π} : stretched Q 1108.8 γ to $7/2^-$ 837; D(+Q) 679 γ to $9/2^{(-)}$ 1266.4; possible band assignment. 1948.3 13 $(9/2)^+$ E G J^{\pi}: L(^3He,d)=4; D 425.9 γ to $(11/2^+)$ 1522. 1948.3 13 $(9/2)^+$ E GH J^{\pi}: L(^3He,d)=4; D 425.9 γ to $(11/2^+)$ 1522. 1985.2 26 $3/2^+, 5/2^+$ e H E(level): 1949.9 20 from (^3He,d). 1985.2 26 $3/2^+, 5/2^+$ e H E(level): 1949.9 20 from (^3He,d). 1985.2 26 $3/2^+, 5/2^+$ e H E(level): from (^3He,d). 1995.9 8 $7/2^{(-)}$ e G J^{\pi}: D(+Q) 729 \gamma to $9/2^{(-)}$ 1266.4; D+Q 972 γ to $5/2^{(-)}$ 1023. 2000.4 11 G G J^{\pi}: D(+Q) 729 \gamma to $5/2^{(-)}$ 1023. G 2055.9 [#] 21 $1/2^-, 3/2^-$ E H J^{\pi}: L(^3He,d)=1. 2085 4 $7/2^+, 9/2^+$ H J^{\pi}: L(^3He,d)=2. J(^3He,d). 17.17.9 10 $3/2^+, 5/2^+$ G H J^{\pi}: L(^3He,d)=1. 2215? 4 H | 1866.4 10 | $(3/2^{-})$ | | e G | | J^{π} : $3/2^{-}$ from excit in (d,ny); isotropic 1030y to $7/2^{-}$ 836. |
| 1945.6d4 $11/2^{(-)}$ GI J^{π} : stretched Q 1108.8y to $7/2^{-}$ 837; D(+Q) 679y to $9/2^{(-)}$ 1266.4; possible band assignment.1948.313 $(9/2)^{+}$ EGI J^{π} : L(3 He,d)=4; D 425.9y to $(11/2^{+})$ 1522. E(level): 1949.9 20 from (3 He,d).1985.226 $3/2^{+},5/2^{+}$ eHE(level): from (3 He,d). J^{\pi}: L(3 He,d)=2.1995.98 $7/2^{(-)}$ eGJ^{\pi}: D(+Q) 729y to $9/2^{(-)}$ 1266.4; D+Q 972y to $5/2^{(-)}$ 1023.2000.411GG2022.010 $(5/2^{+})$ EG2055.9 $^{\#}$ 21 $1/2^{-}, 3/2^{-}$ EHJ ^{π} : D(3 He,d)=1.J ^{π} : L(3 He,d)=4.2058.4 $7/2^{+}, 9/2^{+}$ HJ ^{π} : L(3 He,d)=4.2117.910 $3/2^{+}, 5/2^{+}$ GHXREF: H(2122.5). E(level): 2122.5 21 in (3 He,d). J ^{π} : L(3 He,d)=1.2215.74HJ ^{π} : L(3 He,d)=1.2215.74HJ ^{π} : D(3 He,d)=1.2215.74FJ $^{\pi}$: D(3 He,d)=1.2215.7555221.110 $(3/2,5/2)$ G221.110 $(3/2,5/2)$ G22451552277.9 ^c 11($17/2^{+}$)GIJ ^{π} : γ to ($13/2^{+}$). Band assignment favors ($17/2^{+}$). | 1885.3 7 | $(3/2^{-}, 5/2, 7/2^{-})$ | | e G | | J^{π} : γ to $3/2^{-}$ and $7/2^{-}$. |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1945 6 <mark>d</mark> 4 | $11/2^{(-)}$ | | G | т | I^{π} stretched O 1108 8y to 7/2 ⁻ 837: D(+O) 679y to 9/2 ⁽⁻⁾ 1266.4: possible |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1715.0 7 | 11/2 | | | - | band assignment |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1948 3 13 | $(9/2)^+$ | | F G | ч | I^{π} . I (³ He d)-4: D 425 9v to (11/2 ⁺) 1522 |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1940.5 15 | (9/2) | | E GI | | $F(level): 1040.0.20 \text{ from } ({}^{3}\text{He d})$ |
| 1985.2 20 $3/2^{-}, 3/2^{-}$ e n Effected): from (*fle,d): 1995.9 8 $7/2^{(-)}$ e G J^{π} : $L(^{3}He,d)=2$. 2000.4 11 G G J^{π} : D (+Q) 729 y to $9/2^{(-)}$ 1266.4; D+Q 972 y to $5/2^{(-)}$ 1023. 2025.0 10 $(5/2^{+})$ E G J^{π} : D 1233 y to $5/2^{+}$ 789; excit in $(d,n\gamma)$. 2055.9 # 21 $1/2^{-}, 3/2^{-}$ E H J^{π} : $L(^{3}He,d)=1$. 2085 4 $7/2^{+}, 9/2^{+}$ H J^{π} : $L(^{3}He,d)=4$. 2117.9 10 $3/2^{+}, 5/2^{+}$ GH XREF: H(2122.5). E(level): 2122.5 21 in (^{3}He,d)=1. J^{π} : $L(^{3}He,d)=2$. 2164.1 # 22 $1/2^{-}, 3/2^{-}$ E H J^{π} : $L(^{3}He,d)=1$. 2215? 4 H J^{π} : $L(^{3}He,d)=1$. H Probably differs from 2221 level in $(d,n\gamma)$ because E from $(^{3}He,d)$ is typically to ohigh by several keV. 2221.1 10 $(3/2, 5/2)$ G J^{π} : D 1432 γ to $5/2^{+}$ 789; $3/2$ or $5/2$ from excit in $(d,n\gamma)$. 2245 15 E J^{π} : γ to $(13/2)^{+}$. Band assignment favors $(17/2^{+})$. | 1095 2 26 | 2/2+ 5/2+ | | | | E(level). 1949.9 20 from (frequ). E(level), from (³)Lo d) |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1983.2 20 | 5/2, 5/2 | | е | 1 | $E(\text{level})$: from (* ne, α). |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1005 0 0 | $\pi / 2(-)$ | | ~ | | $J^{*}: L({}^{\circ}He, d) = 2.$ |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 1995.9 8 | 1/2() | | e G | | J^{*} : D(+Q) /29 γ to 9/2 ^(*) 1266.4; D+Q 9/2 γ to 5/2 ^(*) 1023. |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 2000.4 11 | (5/0+) | | G | | I^{I} D 1000 (5/0 ⁺ 700 (() |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 2022.0 10 | $(5/2^{+})$ | | ΕG | | $J^{*}: D \ 1233\gamma \text{ to } 5/2^{+} / 89; \text{ excit in } (d,n\gamma).$ |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | 2055.9# 21 | 1/2-,3/2- | | ΕI | H | J^{π} : L(³ He,d)=1. |
| 2117.9 10 $3/2^+, 5/2^+$ GH XREF: H(2122.5). E(level): 2122.5 21 in (³ He,d). J ^{π} : L(³ He,d)=2. 2164.1 [#] 22 $1/2^-, 3/2^-$ E H J ^{π} : L(³ He,d)=1. Probably differs from 2221 level in (d,n γ) because E from (³ He,d) is typically too high by several keV. 2221.1 10 (3/2,5/2) G J ^{π} : D 1432 γ to 5/2 ⁺ 789; 3/2 or 5/2 from excit in (d,n γ). E G I J ^{π} : γ to (13/2) ⁺ . Band assignment favors (17/2 ⁺). | 2085 4 | 7/2+,9/2+ | | I | H | $J^{\pi}: L({}^{3}\text{He,d})=4.$ |
| E(level): 2122.5 21 in (³ He,d). J^{π} : L(³ He,d)=2. 2164.1 [#] 22 1/2 ⁻ ,3/2 ⁻ E H J^{π} : L(³ He,d)=1. 2215? 4 H Probably differs from 2221 level in (d,n γ) because E from (³ He,d) is typically too high by several keV. 2221.1 10 (3/2,5/2) G J^{π} : D 1432 γ to 5/2 ⁺ 789; 3/2 or 5/2 from excit in (d,n γ). 2245 15 E J^{π} : γ to (13/2) ⁺ . Band assignment favors (17/2 ⁺). | 2117.9 10 | $3/2^+, 5/2^+$ | | GI | H | XREF: H(2122.5). |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | | | E(level): 2122.5 21 in (³ He,d). |
| 2164.1 [#] 22 $1/2^-, 3/2^-$ E H J^{π} : L(³ He,d)=1. 2215? 4 H Probably differs from 2221 level in $(d,n\gamma)$ because E from (³ He,d) is typically too high by several keV. 2221.1 10 $(3/2,5/2)$ G J^{π} : D 1432 γ to $5/2^+$ 789; 3/2 or 5/2 from excit in $(d,n\gamma)$. 2245 15 E 2277.9 ^C 11 $(17/2^+)$ G I J^{π} : γ to $(13/2)^+$. Band assignment favors $(17/2^+)$. | | | | | | J^{π} : L(³ He,d)=2. |
| 2215? 4 H Probably differs from 2221 level in $(d,n\gamma)$ because E from $({}^{3}\text{He,d})$ is typically too high by several keV. 2221.1 10 $(3/2,5/2)$ 2245 15 2277.9 ^C 11 $(17/2^{+})$ G I J^{π} : γ to $(13/2)^{+}$. Band assignment favors $(17/2^{+})$. | 2164.1 ^{#} 22 | $1/2^{-}.3/2^{-}$ | | ΕI | н | J^{π} : L(³ He.d)=1. |
| 2221.1 10 $(3/2,5/2)$ G J ^{π} : D 1432 γ to 5/2 ⁺ 789; 3/2 or 5/2 from excit in (d,n γ). 2245 15 E 2277.9 ^C 11 $(17/2^+)$ G I J ^{π} : γ to $(13/2)^+$. Band assignment favors $(17/2^+)$. | 2215? 4 | 7 7-7 - | | 1 | н | Probably differs from 2221 level in $(d n\gamma)$ because E from $({}^{3}\text{He }d)$ is typically |
| 2221.1 <i>10</i> (3/2,5/2) G J^{π} : D 1432 γ to 5/2 ⁺ 789; 3/2 or 5/2 from excit in (d,n γ). 2245 <i>15</i> E G I J^{π} : γ to (13/2) ⁺ . Band assignment favors (17/2 ⁺). | | | | | - | too high by several keV. |
| 2245 15 E G I J^{π} : γ to $(13/2)^+$. Band assignment favors $(17/2^+)$. | 2221.1 10 | (3/2, 5/2) | | G | | J^{π} : D 1432 γ to 5/2 ⁺ 789; 3/2 or 5/2 from excit in (d.n γ). |
| 2277.9 ^{<i>c</i>} 11 (17/2 ⁺) G I J^{π} : γ to (13/2) ⁺ . Band assignment favors (17/2 ⁺). | 2245 15 | <u><u></u> </u> | | E | | ······································ |
| | 2277.9 ^c 11 | $(17/2^+)$ | | G | I | J ^{π} : γ to (13/2) ⁺ . Band assignment favors (17/2 ⁺). |

Continued on next page (footnotes at end of table)

⁸¹Br Levels (continued)

| E(level) [†] | J^{π} | T _{1/2} <i>a</i> | XR | EF | Comments |
|----------------------------------|----------------------|---------------------------|----|--------|--|
| 2288.4 ^{#} 21 | $1/2^{+}$ | | Е | н | J^{π} : L(³ He,d)=0. |
| 2305.0 10 | $(7/2^{-})$ | | | G | J^{π} : $\gamma(\theta)$ to $7/2^{-}$ in (d,n γ). |
| 2387.5? ^d 4 | $(13/2^{-})$ | | | I | J^{π} : D γ to $11/2^{(-)}$; γ to $9/2^{(-)}$; band assignment favors $(13/2^{-})$. |
| 2410 15 | | | E | | |
| 2421.2 11 | | | | G | J^{π} : γ to $(13/2)^+$. |
| 2477.3 [#] 22 | | | E | Н | E(level), J^{π} : unresolved doublet with L=1+4 in (³ He,d). |
| 2531.7 22 | | | | Н | E(level), J^{π} : unresolved doublet with L=0+1 in (³ He,d). |
| 2549.4 ^b 4 2620 15 | (13/2 ⁻) | | E | GΙ | J^{π} : γ to $11/2^{(-)}$; Q γ to $9/2^{(-)}$; band assignment. |
| 2657.1 [#] 22 | $3/2^+, 5/2^+$ | | Е | н | J^{π} : L(³ He,d)=2. |
| 2668.5 ^b 4 | (15/2-) | <0.2 ns | | I | J ^{π} : γ to 11/2 ⁽⁻⁾ ; (M1) γ to (13/2 ⁻); band assignment. T _{1/2} : from centroid shift in (α ,p2n γ). |
| 2704.4 ^{#} 23 | $1/2^{-}, 3/2^{-}$ | | Е | н | J^{π} : L(³ He,d)=1. |
| 2731.5 27 | + | | | н | E(level), J^{π} : unresolved doublet with L=2+4 in (³ He,d). |
| 2788 15 | | | E | | E(level): probably corresponds to at least one component of $E=2797.4$ doublet in (³ He,d). |
| 2797.4 20 | | | | Н | E(level): unresolved doublet with L= $4+(1,2)$ in (³ He,d). |
| 2912.6 [#] 21 | | | Е | н | |
| 2940 <i>3</i> | | | | Н | |
| 2942.1 ^b 4 | $(17/2^{-})$ | | | I | J^{π} : M1 274.6 γ to (15/2 ⁻) 2669; band assignment. |
| 3001 [#] 3 | | | Е | Н | |
| 3027 3 | | | | Н | |
| 3067 3 | | | | н | |
| 3089.0? 5 | | | _ | 1 | $J^{*}: \gamma \text{ to } (1/2).$ |
| 3101" 15 | | | E | Н | $\mathbf{E}(\mathbf{a}_{i})$ from (\mathbf{a}_{i}) |
| 3190 13 | | | E | т | E(level): from (p,γ) . $I^{\pi} \cdot \chi$ to $(17/2^{-})$ |
| 3242 15 | | | Е | - | <i>5</i> . <i>y</i> (0 (17/2). |
| 3322 \$ 15 | | | | н | |
| 3333.5 ^b 4 | (19/2 ⁻) | 0.69 ps 28 | | I | J^{π} : (M1+E2) γ to (17/2 ⁻); band assignment. T _{1/2} : from DSAM (α ,p2n γ). |
| 3429 [‡] 15 | | | | н | |
| 3508 [‡] 20 | | | | н | |
| 3526.9 ^c 13 | $(21/2^+)$ | | | ï | J^{π} : band assignment favors (21/2 ⁺). |
| 3598 [‡] 20 | | | | н | |
| 36802 [‡] 20 | | | | н | |
| $3740^{\ddagger} 20$ | | | | н | |
| 3759 15 | | | Е | | |
| 3798.8 ^b 5 | $(21/2^{-})$ | | | Т | J^{π} : D γ to (19/2 ⁻): band assignment. |
| 3835 [‡] 20 | | | | н | |
| 3965 15 | | | | н | |
| 4106 [‡] 20 | | | | н | |
| 4174 20 | | | | н | |
| 1202 15 | | | | и и | |
| 4302 13 | | | | п | |
| 4420 13 | | | | n H | |
| 4512 15 | | | | H | |
| 4559+ 15 | | | | н | |
| 5632+ 15 | | | | Н | |

⁸¹Br Levels (continued)

| E(level) [†] | J^{π} | T _{1/2} <i>a</i> | XREF | Comments |
|-----------------------|-------------------|---------------------------|------|--|
| 5791 [‡] 20 | | | Н | |
| 11286 10 | $1/2^{-}$ | 19 keV 3 | F | J^{π} : L(p,p)=1 (1968Ba23); IAS. |
| | | | | Analog of ⁸¹ Se g.s |
| 11392 10 | 7/2+ @ | | F | Analog of ⁸¹ Se(103 level). |
| 11755 10 | $3/2^{-a}$ | 18 keV 3 | F | Analog of ⁸¹ Se(468 level). |
| 12297 10 | 5/2+ | 18 keV 3 | F | J^{π} : L(p,p)=2 (1968Ba23); IAS. Analog of ⁸¹ Se(1053 level). |
| 12428 10 | 1/2+ | 48 keV 5 | F | J^{π} : L(p,p)=0 (1968Ba23). Analog of $1/2^{+81}$ Se(1233 level). |
| 12509 10 | 5/2+ | 32 keV 4 | F | J^{π} : L(p,p)=2 (1968Ba23); IAS. Analog of $5/2^{+81}$ Se(1304 level). |
| 12668 | 3/2 ^{-@} | 24 keV 4 | F | Analog of ⁸¹ Se(1406 level). |

[†] For a least-squares fit to adopted $E\gamma$, assigning $\Delta E=1$ keV to $E\gamma$ data for which no uncertainty was reported by the authors. $E\gamma$ data from $(d,n\gamma)$ are within 0.2 keV of those determined precisely in other reactions, whenever comparison can be made.

[‡] From 1967Ev03 in (³He,d), whose energy scale is consistently high. Energy probably at least 35 keV lower than the reported values by authors.

[#] From $(^{3}\text{He,d})$.

[@] From J^{π} for corresponding IAS.

[&] Based on particle-vibrator-core model, which predicts B(E2) for this level more successfully than does the particle-rotor-core model, this state can be described by a wave function which contains a significant contribution from configuration=((π p_{3/2}) coupled to 2⁺ core) (1996Ja09).

^{*a*} From DSAM and/or Doppler broadening in Coulomb excitation (except as noted) for E(level)<6 MeV; Γ (tot) from ⁸⁰Se(p,p), (p,n) IAR otherwise.

^b Band(A): Possible 3-quasiparticle band (1986Fu04). Configuration probably includes at least one $g_{9/2}$ proton (low-energy $\Delta J=1 \gamma$ cascade in band suggests large angular momentum alignment) (1986Fu04).

^{*c*} Band(B): Possible (π g_{9/2}) band (1986Fu04).

^d Band(C): Possible (π p_{3/2}) g.s. band (1986Fu04). 3/2[301] or 3/2[312] orbital suggested in (d,n γ) (1989DjZW).

| | | | | | Ad | opted Leve | ls, Gammas (| continued) | |
|---------------|----------------------|-----------------------------|------------------------|---------|-------------|--------------------|----------------------------|-------------------------|--|
| | | | | | | | $\gamma(^{81}\mathrm{Br})$ | | |
| E_i (level) | \mathbf{J}_i^{π} | E_{γ}^{\dagger} | I_{γ}^{\dagger} | E_f | J_f^{π} | Mult. [†] | δ^{\dagger} | α^{e} | Comments |
| 275.986 | 5/2- | 275.990 [@] 10 | 100 | 0.0 | 3/2- | M1+E2 | -0.10 3 | 0.00816 14 | B(E2)(W.u.)=16.3 8; B(M1)(W.u.)=0.106 +18-14 α(K)=0.00724 13; α(L)=0.000781 14; α(M)=0.0001242 23 α(N)=1.158×10 ⁻⁵ 21 Mult.: from α(K)exp in ⁸¹ Se β ⁻ decay (18.5 min). δ: from γ(θ) in Coulomb excitation. Other: 0.45 +14-15 from α(K)exp and α(L)exp in ⁸¹ Se β ⁻ decay (18.5 min). B(E2)(W.u.): same value from measured B(E2)↑=0.0508 25. |
| 536.291 | 9/2+ | 260.305 ^{&} 12 | 100 | 275.986 | 5/2- | M2 | | 0.0454 6 | B(M2)(W.u.)=0.0368 +34-28 α (K)=0.0399 6; α (L)=0.00468 7; α (M)=0.000749 10 α (N)=6.92×10 ⁻⁵ 10 Mult.,δ: pure M2 from α (K)exp, α (L)exp in ⁸¹ Se β^- decay (57.28 min) |
| 538.194 | 1/2-,3/2- | 538.189 [@] 14 | 100 | 0.0 | 3/2- | M1+E2 | 0.087 15 | 1.63×10 ⁻³ 2 | B(M1)(W.u.)=0.184 7; B(E2)(W.u.)=5.9 +23-19 α (K)=0.001454 20; α (L)=0.0001540 22; α (M)=2.448×10 ⁻⁵ 34 α (N)=2.293×10 ⁻⁶ 32 |
| 566.124 | 3/2- | 290.138 [@] 13 | 100.0 [@] 10 | 275.986 | 5/2- | E2+M1 | +1.11 ^d 22 | 0.0131 12 | B(M1)(W.u.)=0.0043 +20-15; B(E2)(W.u.)=77 29 α (K)=0.0115 11; α (L)=0.00130 12; α (M)=0.000205 20 α (N)=1.87×10 ⁻⁵ 17 Mult.: from α (K)exp in ⁸¹ Se β ⁻ decay (18.5 min). δ: other: M1+93(2)% E2 yields δ=3.6 +7-5, 290γ-276γ A ₂₂ =0.060 9 and A ₄₄ =0.14 14 (1980MuZR). |
| | | 566.123 ^{&} 14 | 37.8 5 | 0.0 | 3/2- | E2+M1 | -3.0 5 | 0.00199 <i>4</i> | B(M1)(W.u.)=4.9×10 ⁻⁵ +27-18; B(E2)(W.u.)=1.7 +6-5 α (K)=0.001763 32; α (L)=0.0001908 35; α (M)=3.03×10 ⁻⁵ 6 α (N)=2.80×10 ⁻⁶ 5 I _γ : weighted average of 37.8 4 from ⁸¹ Se β ⁻ decay (18.5 min) and 35.1 27 from Coulomb excitation. Others: 46 23 from (p,γ) and 45 4 from (n,n'γ). B(E2)(W.u.): same value from measured B(E2)↑. δ : δ (D,Q): -3.0 5 or -0.08 5 from (p,γ); the latter δ implies a T _{1/2} (566 level) value which is inconsistent with RUL and δ (290γ). |

L

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| | Adopted Levels, Gammas (continued) | | | | | | | | | | | | | |
|------------------------|--------------------------------------|--|---|---------------------------|--|---|--------------------|--------------------------|--|--|--|--|--|--|
| | | | | | | $\gamma(^{81})$ | Br) (continued | <u>l)</u> | | | | | | |
| E _i (level) | J_i^π | E_{γ}^{\dagger} | I_{γ}^{\dagger} | \mathbf{E}_{f} | \mathbf{J}_f^{π} | Mult. [†] | δ^{\dagger} | α^{e} | Comments | | | | | |
| 650.003 | (3/2)- | 649.990 [@] 19 | 100 | 0.0 | 3/2- | M1+E2 | +0.111 7 | 1.07×10 ⁻³ 2 | B(M1)(W.u.)=0.0304 +40-32; B(E2)(W.u.)=1.09 6 α(K)=0.000950 13; α(L)=0.0001003 14; α(M)=1.593×10 ⁻⁵ 22 α(N)=1.494×10 ⁻⁶ 21 B(E2)(W.u.): from measured B(E2)↑=0.00226 13. Other: B(E2)W.u=1.10 +21-17 using the T _{1/2} and | | | | | |
| 767.04 | (5/2)- | 491.3 <i>3</i> | 15.1 <i>12</i> | 275.986 | 5/2- | M1+E2 | +0.25 13 | 0.00208 8 | adopted γ -ray properties. δ : sign from (p, γ). Other: +0.08 4 from (p, γ). B(M1)(W.u.)=0.042 +5-6; B(E2)(W.u.)=14 +15-10 α (K)=0.00184 7; α (L)=0.000196 8; α (M)=3.12×10 ⁻⁵ 13 α (N)=2.92×10 ⁻⁶ 12 E _{γ} : weighted average of 491.7 6 from (p, γ) and 491.2 3 from Coulomb excitation. I _{γ} : weighted average of 14.9 15 from (n,n' γ) and 15 3 12 from Coulomb excitation. Other I α : 26 4 | | | | | |
| | | 767.01 10 | 100 4 | 0.0 | 3/2- | M1+E2 | -0.263 11 | 7.49×10 ⁻⁴ 11 | 15.5 <i>12</i> from Collomb excitation. Unter <i>1</i> y: 26 4 from (p,γ), 157 from (d,nγ) if Iγ(767)=100. B(M1)(W.u.)=0.074 6; B(E2)(W.u.)=10.1 5 α (K)=0.000666 9; α (L)=7.02×10 ⁻⁵ <i>10</i> ; α (M)=1.114×10 ⁻⁵ <i>16</i> α (N)=1.045×10 ⁻⁶ <i>15</i> B(E2)(W.u.): from measured B(E2)↑=0.0315 16. Other: 10.7 <i>12</i> from adopted T _{1/2} and 767.01γ-ray properties. E _γ : weighted average of 766.9 5 from ⁸¹ Se β ⁻ decay (57.28 min), 767.0 <i>1</i> from (p,p'γ), and 767.2 4 from Coulomb excitation. Other: 767.0 7 from (p,γ). δ: from B(E2)↑ and T _{1/2} in Coulomb excitation. Also others: -0.16 <i>3</i> and 0.33 <i>5</i> from $\gamma(\theta)$, from Coulomb excitation. | | | | | |
| 789.258 828.434 | 5/2 ⁺ 3/2 ⁻ | 513.5 [‡] 789.254 ^{&} 19 178.416 [@] 24 | 37 [‡] 100 2.11 [@] 9 | 275.986 0.0 650.003 | 5/2 ⁻ 3/2 ⁻ (3/2) ⁻ | D ^c D ^c (M1+E2) | <0.28 | 0.0272 29 | B(M1)(W.u.)>0.097 α (K)=0.0241 25; α (L)=0.00267 32; α (M)=0.00042 5 α (N)=3.9×10 ⁻⁵ 4 B(E2)(W.u.)<452 upper limit exceeds RUL=300. Mult.,δ: E1 or M1(+E2) from α (K)exp<0.05, α (L)exp<0.003 in ⁸¹ Se β ⁻ decay (18.5 min); adopted $\Delta\pi$ =no. δ from α (L)exp. | | | | | |

| | | | | | Ad | opted Leve | ls, Gammas (| continued) | |
|------------------------|----------------------|---|---------------------------------|--------------------|--|--------------------|--------------------|--------------------------|---|
| | | | | | | $\gamma(^{81})$ | Br) (continued |) | |
| E _i (level) | \mathbf{J}_i^{π} | E_{γ}^{\dagger} | I_{γ}^{\dagger} | E_f | J_f^π | Mult. [†] | δ^{\dagger} | α^{e} | Comments |
| 828.434 | 3/2- | 290.1 [@] 1 552.455 [@] 14 | 5.5 [@] 11 31.26 23 | 538.194 275.986 | 1/2 ⁻ ,3/2 ⁻ 5/2 ⁻ | M1+E2 | +0.32 20 | 0.00160 8 | B(M1)(W.u.)=0.058 11; B(E2)(W.u.)=24 +32-20 α (K)=0.00142 7; α (L)=0.000151 8; α (M)=2.40×10 ⁻⁵ 13 α (N)=2.24×10 ⁻⁶ 12 I_{γ} : weighted average of 31.26 23 from ⁸¹ Se β^{-} decay |
| | | | | | | | | | (18.5 min), 33 6 from (p,γ) , 33 4 from $(n,n'\gamma)$, and 32 4 from Coulomb excitation. δ : +0.32 20 or +1.6 5 from (p,γ) ; evaluator rejects latter value because it gives B(E2)(W.u.)=241 93 (possible, but abnormally high for this mass region [see 1979En04]). Other: δ =0.40 +4-5 from M1+13.5(25)%, 553y-276y A ₂₂ =-0.182 27 and A ₄₄ =-0.02 5 (1980MuZR). |
| | | 828.36 17 | 100.0 12 | 0.0 | 3/2- | M1+E2 | +0.18 3 | 6.29×10 ⁻⁴ 9 | Mult. D+Q from (p,y), π from coulomb excitation. B(M1)(W.u.)=0.059 +11-8; B(E2)(W.u.)=3.4 +14-11 α (K)=0.000560 8; α (L)=5.89×10 ⁻⁵ 8; α (M)=9.35×10 ⁻⁶ 13 α (N)=8.77×10 ⁻⁷ 12 D(T2)) 0.058 5 |
| | | | | | | | | | B(E2)(w.u.): from measured B(E2)=0.058 5. E _{γ} : weighted average of 828.33 17 from ⁸¹ Se β^- decay (18.5 min), 828.2 7 from (p, γ), and 828.7 5 from Coulomb excitation. I _{γ} : Weighted average of 100 7 from β^- decay (18.5 min), 100 4 from Coulomb excitation, 100 22 from (p, γ) and 100 11 from (n,n' γ). δ : other: +0.16 +5-10 (p, γ). |
| 836.82 | 7/2- | 560.9 ^{<i>a</i>} 1 | 100 7 | 275.986 | 5/2- | M1+E2 | -0.199 12 | 1.51×10 ⁻³ 2 | B(M1)(W.u.)=0.084 7; B(E2)(W.u.)=13.0 +19-17 α (K)=0.001339 19; α (L)=0.0001420 20; α (M)=2.256×10 ⁻⁵ 32 α (N)=2.112×10 ⁻⁶ 30 Mult : from Coulomb excitation: D+O from (p γ) |
| | | 836.2 4 | 37 5 | 0.0 | 3/2- | E2 | | 7.06×10 ⁻⁴ 10 | δ: weighted average of -0.24 3 from (p,γ) and -0.193 <i>12</i> from γ(θ) in Coulomb excitation and -0.19 +3-4 in (d,nγ). Other: 0.30 4 from γ(θ) in Coulomb excitation (1996Ja09); the weighted average -0.21 2 including the other datum. B(E2)(W.u.)=17.1 +23-21 $ α(K)=0.000628 9; α(L)=6.68 \times 10^{-5} 9; $ |
| | | | | | | | | | $\alpha(K)=0.000628 \ 9; \ \alpha(L)=6.68\times10^{-3} \ 9; \ \alpha(M)=1.060\times10^{-5} \ 15$ |

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| | Adopted Levels, Gammas (continued) | | | | | | | | | | | | |
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| | | | | | | $\gamma(^{81}\mathrm{Br})$ | (continued) | | | | | | |
| E _i (level) | ${ m J}^{\pi}_i$ | E_{γ}^{\dagger} | I_{γ}^{\dagger} | \mathbf{E}_{f} | J_f^π | Mult. [†] | δ^{\dagger} | α^{e} | Comments | | | | |
| | | | | | | | | | $\begin{aligned} \alpha(\mathrm{N}) = 9.87 \times 10^{-7} \ 14 \\ \mathrm{E}_{\gamma}: \ \text{weighted average of } 835.5 \ 5 \ \mathrm{from}^{81} \mathrm{Se} \ \beta^{-} \\ \mathrm{decay} \ (18.5 \ \mathrm{min}), \ 835.4 \ 11 \ \mathrm{from} \ (\mathrm{p}, \gamma), \ 836.5 \ 4 \\ \mathrm{from} \ (\alpha, \mathrm{p2n}\gamma), \ \mathrm{and} \ 836.5 \ 5 \ \mathrm{from} \ \mathrm{Coulomb} \\ \mathrm{excitation.} \\ \mathrm{I}_{\gamma}: \ \mathrm{weighted} \ \mathrm{average} \ \mathrm{of} \ 42 \ 17 \ \mathrm{from} \ (\alpha, \mathrm{p2n}\gamma), \ 41 \ 4 \\ \mathrm{from} \ (\mathrm{n}, \mathrm{n}'\gamma), \ \mathrm{and} \ 23 \ 7 \ \mathrm{from} \ \mathrm{Coulomb} \ \mathrm{excitation.} \\ \mathrm{Other:} \ 60 \ 30 \ \mathrm{from} \ (\mathrm{p}, \gamma). \end{aligned}$ | | | | |
| 1023.7 | $5/2^{(-)}$ | 457.5 [‡] | 21 [‡] | 566.124 | 3/2- | D ^C | | | | | | | |
| | | 485.4 [‡] | 12 | 538.194 | 1/2-,3/2- | Q ^C | | | I_{γ} : other: 19 5 (n,n' γ). | | | | |
| | | 747.5 [‡] | 100 | 275.986 | 5/2- | D ^C | | | E_{γ} : other: 748.2 9 from (p,γ) – higher value. I_{γ} : other: 100 26 (p,γ) . | | | | |
| | | 1023.6 | 16 | 0.0 | 3/2- | | | | I_{γ} : other: 9.0 26 (n,n' γ). | | | | |
| 1076.2? | | 538.2 [#] | | 538.194 | 1/2-,3/2- | | | | | | | | |
| | | 1076.0 ^{#f} | | 0.0 | 3/2- | | | | | | | | |
| 1105.3 | $(1/2)^{-}$ | 539.2 [‡] | 35 [‡] | 566.124 | 3/2- | | | | | | | | |
| | | 566.2 ^{#f} | | 538.194 | 1/2-,3/2- | | | | E_{γ} : absent in (d,n γ). | | | | |
| | | 829.4 [‡] | 77‡ | 275.986 | 5/2- | | | | | | | | |
| | | 1105.3 [‡] | 100 [‡] | 0.0 | 3/2- | D ^C | | | | | | | |
| 1176.90 | (13/2)+ | 640.6 2 | 100 | 536.291 | 9/2+ | E2 | | 1.44×10 ⁻³ 2 | α(K)=0.001274 I8; α(L)=0.0001373 I9; α(M)=2.177×10-5 31 α(N)=2.017×10-6 28 Eγ,Mult.: from γ(θ) and linear polarization measurements (α,p2nγ). | | | | |
| 1237.88 | | 961.9 ^a 1 | 100 [#] 26 | 275.986 | 5/2- | | | | | | | | |
| | | 1236.7 [#] | 100 [#] 26 | 0.0 | 3/2- | | | | | | | | |
| 1266.4 | 9/2 ⁽⁻⁾ | 430 ^b 1 | ≈45 ^b | 836.82 | 7/2- | D+Q | -0.19 +4-30 | | Mult., δ : from (d,n γ). I _{γ} : other: 72 in (d,n γ). | | | | |
| | | 990.4 ^b 3 | 100 ^b 18 | 275.986 | 5/2- | (E2) | | 4.67×10 ⁻⁴ 7 | $\alpha(K)=0.000416 \ 6; \ \alpha(L)=4.40\times10^{-5} \ 6; \ \alpha(M)=6.98\times10^{-6} \ 10 \ \alpha(N)=6.52\times10^{-7} \ 9 \ Mult.: Q \ from \ \gamma(\theta), M2 \ unlikely \ from \ systematics \ (from \ (\alpha, p_{2}n_{2})))$ | | | | |
| 1266.9 | $(3/2^{-}, 5/2, 7/2^{-})$ | 430.6 [#] | 100 [#] 2.5 | 836.82 | 7/2- | | | | ((~)P=-//), | | | | |
| | (-,-,-,-,-) | 500.0 [#] | $100^{\#} 2.5$ | 767.04 | $(5/2)^{-}$ | | | | | | | | |
| | | 1266.1# | 50 [#] 13 | 0.0 | 3/2- | | | | possible doublet. | | | | |

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From ENSDF

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| | Adopted Levels, Gammas (continued) | | | | | | | | | | | | | |
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| | | | | | | $\gamma(^{81}\mathrm{Br})$ | (continued) | | | | | | | |
| E _i (level) | \mathbf{J}_i^{π} | E_{γ}^{\dagger} | I_{γ}^{\dagger} | E_f | \mathbf{J}_f^{π} | Mult. [†] | δ^{\dagger} | Comments | | | | | | |
| 1323.0 | (5/2)- | 486.4 4 | 25 10 | 836.82 | 7/2- | | | I _{γ} : unweighted average of 15 4 from (n,n' γ) and 35 8 from Coulomb excitation. | | | | | | |
| | | 1046.1 10 | 100 8 | 275.986 | 5/2- | | | | | | | | | |
| | | 1322.8 [#] | 20 [#] 5 | 0.0 | 3/2- | | | From measured B(E2), B(E2)(W.u.)= 3.95 or 3.04 for J= $5/2^{-1}$ or $7/2^{-1}$, respectively. | | | | | | |
| 1327.3 | | 492 ^f 561.4 <i>12</i> | 20 20 | 836.82 767.04 | 7/2 ⁻ (5/2) ⁻ | | | E_{γ} : from (p,γ) . E_{γ} : from (p,γ) . I_{γ} : from divided I_{γ} for doublet in (p,γ) . | | | | | | |
| | | 676.6 7 789.3 5 | 15 5 100 25 | 650.003 538.194 | $(3/2)^{-}$ $1/2^{-}, 3/2^{-}$ | | | $\dot{E}_{\gamma}, I_{\gamma}$: from (p, γ). E_{γ} : weighted average 789.6 7 from from (p, γ) and 789.1 5 from β^{-} decay (18.5 min). I_{γ} : from (p, γ). | | | | | | |
| 1349.8 | | 326.0^{a} 4 | $100^{\#} 25$ | 1023.7 | 5/2 ⁽⁻⁾ | | | | | | | | | |
| | | 583.1" | 55'' 13 | /6/.04 | (5/2) | | | | | | | | | |
| 1371 / | 7/2+ | 1350.0" | 34" 9 100 | 0.0 | 3/2 5/2+ | $D(10)^{c}$ | 1004 18 4 | $\mathbf{F} = \delta \mathbf{f} \mathbf{r} \mathbf{o} \mathbf{m} (\mathbf{d} \mathbf{n} \mathbf{a})$ | | | | | | |
| 1371.4 | 1/2 | 572.1 | 85 [#] 22 | 220 121 | 2/2- | $D(\mp Q)$ | +0.04 +0-4 | $E_{\gamma}, 0.$ from (u, ii). | | | | | | |
| 1400.97 | | 372.0° | $100^{\frac{1}{2}}$ | 0.0 | 3/2 2/2- | | | | | | | | | |
| 1401 0 | $(7/2^{-})$ | 714.6 | 20 [±] | 767.04 | $\frac{5}{2}$ | $D(10)^{c}$ | $0.12^{\circ} + 81.10$ | | | | | | | |
| 1401.0 | (1/2) | ×21 0 [±] | 32. | 650.002 | $(3/2)^{-}$ | $D(\mp Q)$ | -0.12 +01-10 | | | | | | | |
| | | 015 7 | 100 | 566 124 | (3/2) $3/2^{-}$ | | | | | | | | | |
| 1513.0 | $(1/2^{-} 3/2^{-})$ | 046.0 | 100 | 566 124 | 3/2- | DC | | | | | | | | |
| 1515.0 | $(1/2^+, 3/2^-)$ | 345 4 | 100 | 1176.90 | $(13/2)^+$ | D | | | | | | | | |
| 1522.7 | (11/2) | 986 2 [‡] | 100 [‡] | 536 291 | (13/2) $0/2^+$ | D+0 ^C | $\pm 0.09^{\circ} \pm 21 - 2$ | | | | | | | |
| 1535.9 | $(3/2^{-})$ | 900.2* | 71‡ | 538 194 | $\frac{3}{2}$ $\frac{1}{2} - \frac{3}{2}$ | עדע D ^C | +0.09 +21-2 | | | | | | | |
| 1555.7 | (3/2) | 1535.9 | 100 [‡] | 0.0 | 3/2- | D ^C | | | | | | | | |
| 1536.0 | | $458.5^{\#f}$ | 100 | 1076.22 | 5/2 | D | | | | | | | | |
| 1550.0 | | 886.0 [#] | 100 [#] 24 | 650.003 | $(3/2)^{-}$ | | | | | | | | | |
| | | 997 7 [#] | $38^{\#}$ 11 | 538 194 | (3/2) $1/2^{-} 3/2^{-}$ | | | | | | | | | |
| | | 1260 1 [#] | $51^{\#} 14$ | 275 986 | 5/2 ⁻ | | | | | | | | | |
| | | 1536.0 [#] | 81 [#] 22 | 0.0 | $3/2^{-}$ | | | | | | | | | |
| 1541.5 | $(9/2^+)$ | 752.2 | 100 | 789.258 | $5/2^+$ | 0 ^c | | | | | | | | |
| 1543.0 | (-/=) | 715.4 [#] | $100^{\#} 25$ | 828.434 | $3/2^{-}$ | × | | | | | | | | |
| 10 10.0 | | 775.0 [#] | $10.6^{\#} 24$ | 767.04 | $(5/2)^{-}$ | | | | | | | | | |
| | | $1266 1^{f}$ | 10.0 27 | 275 986 | 5/2- | | | E _v : from $(n, n'\gamma)$ for multiply-placed γ | | | | | | |
| | | 1200.1 | | 2,5.700 | | | | Ly. non (iiii /) for manipy proof /. | | | | | | |

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| | | | | | Adopted | Levels, Gamn | nas (continued) | | |
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| | | | | | | $\gamma(^{81}\text{Br})$ (conti | nued) | | |
| E _i (level) | \mathbf{J}_i^{π} | E_{γ}^{\dagger} | I_{γ}^{\dagger} | E_f | J_f^π | Mult. [†] | δ^{\dagger} | α^{e} | Comments |
| 1543.0 | | 1543.2 [#] | 7.1 [#] 24 | 0.0 | 3/2- | | | | |
| 1543.2 | $(3/2^{-})$ | 706.6 [‡] | 19 [‡] | 836.82 | 7/2- | | | | |
| | | 977.0 [‡] | 62 [‡] | 566.124 | 3/2- | D ^C | | | |
| | | 1267.2 [‡] | 100 [‡] | 275.986 | $5/2^{-}$ | D ^C | | | |
| | | 1543.1 [‡] | | 0.0 | 3/2- | | | | |
| 1586.8 | 1/2+ | 797.5 [‡] | 100 | 789.258 | $5/2^{+}$ | | | | |
| 1587.4 | | 1311.5 [#] | 41 [#] 10 | 275.986 | 5/2- | | | | |
| | | 1587.2 [#] | 100 [#] 25 | 0.0 | 3/2- | | | | |
| 1670.7 | | 1393.7 [#] | 23 [#] 6 | 275.986 | 5/2- | | | | |
| | | 1670.8 ^a 3 | 100 [#] 25 | 0.0 | 3/2- | | | | |
| 1681.2 | $(7/2^{-})$ | 657.4 | 18‡ | 1023.7 | $5/2^{(-)}$ | $D(+Q)^{C}$ | $-0.02^{\circ} + 8 - 9$ | | |
| | | 844.5 [‡] | 100‡ | 836.82 | 7/2- | | | | |
| 1696.0 | $(3/2^+)$ | 906.7 [‡] | 100 | 789.258 | 5/2+ | D ^C | | | |
| 1751.5 | | 914.7 [‡] | 100 | 836.82 | 7/2- | | | | |
| 1788.7 | $(7/2^+)$ | 999.4 [‡] | 100 | 789.258 | 5/2+ | D+Q ^C | $-0.18^{\circ} + 6 - 5$ | | |
| 1798.9 | $(5/2^{-})$ | 1031.9 [‡] | 100 | 767.04 | $(5/2)^{-}$ | D ^C | | | |
| 1866.4 | $(3/2^{-})$ | 1029.6 | 100 | 836.82 | $7/2^{-}$ | | | | |
| 1885.3 | $(3/2^{-}, 5/2, 7/2^{-})$ | 1048.6 [‡] | 127 | 836.82 | 7/2- | | | | |
| | | 1319.0 [‡] | 1007 | 566.124 | 3/2- | | | | |
| 1945.6 | 11/2 ⁽⁻⁾ | 679.4 ^b 4 | ≈100 | 1266.4 | 9/2 ⁽⁻⁾ | (M1(+E2)) | -0.09 13 | 9.67×10 ⁻⁴ 17 | $\begin{aligned} &\alpha(\mathbf{K}) = 0.000860 \ 15; \ \alpha(\mathbf{L}) = 9.07 \times 10^{-5} \ 16; \\ &\alpha(\mathbf{M}) = 1.441 \times 10^{-5} \ 26 \\ &\alpha(\mathbf{N}) = 1.351 \times 10^{-6} \ 24 \\ &\text{Mult.}_{,\delta}: \ \text{from } (\mathbf{d}, \mathbf{n}\gamma) \ \text{for intraband } \gamma. \\ &\mathbf{I}_{\gamma}: \ \mathbf{I}(679\gamma): \mathbf{I}(1109\gamma) = 3.2 \ 8:6 \ 2 \ \text{from} \\ &(\alpha, p 2 \mathbf{n}\gamma), \ \text{but } 2.1:1.7 \ \text{from } (\mathbf{d}, \mathbf{n}\gamma). \end{aligned}$ |
| | | 1108.8 ^b 5 | ≈100 | 836.82 | 7/2- | (E2) | | 3.61×10 ⁻⁴ 5 | $ α(K)=0.000321 5; α(L)=3.38 \times 10^{-5} 5; α(M)=5.37 \times 10^{-6} 8 α(N)=5.02 \times 10^{-7} 7; α(IPF)=9.60 \times 10^{-7} 20 Ιγ: see comment on 679γ from 1946 level. Mult.: Q from (d,nγ); M2 unlikely since it would lead to T1/2(1946 level)>0.6 ns from RUL (γγ coin observed from that level); intraband γ. $ |
| 1948.3 | $(9/2)^+$ | 425.9 [‡] | 100 | 1522.4 | $(11/2^+)$ | D ^C | | | |
| 1995.9 | $7/2^{(-)}$ | 729.4 [‡] | 64 [‡] | 1266.4 | $9/2^{(-)}$ | D(+Q) ^C | -0.1^{c} 5 | | |

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| $\gamma(^{81}\text{Br})$ (continued) | | | | | | | | | |
|--------------------------------------|------------------------------|--|------------------------|---------|----------------------------|----------------------|--------------------|--------------|---|
| E _i (level) | \mathbf{J}_i^π | E_{γ}^{\dagger} | I_{γ}^{\dagger} | E_f | \mathbf{J}_f^{π} | Mult. [†] | δ^{\dagger} | α^{e} | Comments |
| 1995.9 | 7/2 ⁽⁻⁾ | 972.2 [‡] | 100 [‡] | 1023.7 | $5/2^{(-)}$ | D+Q ^C | -0.65^{c} +12-24 | | |
| 2000.4 2022.0 | (5/2 ⁺) | 1232.7 [‡] | 100 | 789.258 | (13/2) 5/2 ⁺ | D ^C | | | |
| 2117.9 | $3/2^+, 5/2^+$ (3/2, 5/2) | 1328.6 ⁺ 1431.8 [‡] | 100 | 789.258 | $5/2^+$ $5/2^+$ | D ^C | | | |
| 2277.9 | $(17/2^+)$ | 1101 ^b 1 | 100 | 1176.90 | $(13/2)^+$ | D | | | |
| 2305.0 | $(7/2^{-})$ | 1468.2 [‡] | 100 | 836.82 | $7/2^{-}$ | D ^C | | | |
| 2387.5? | (13/2 ⁻) | 441.9 ^b 2 | 56 ^b 16 | 1945.6 | 11/2 ⁽⁻⁾ | (M1) | | 0.00257 4 | α (K)=0.002286 32; α (L)=0.0002433 34; α (M)=3.87×10 ⁻⁵ 5 α (N)=3.62×10 ⁻⁶ 5 Mult.: from (α ,p2n γ), (α ,p γ) for intraband transition. |
| | | 1120 ^b 1 | ≈100 b | 1266.4 | $9/2^{(-)}$ | | | | |
| 2421.2 | | 1244.3 [‡] | 100 | 1176.90 | $(13/2)^+$ | | | | |
| 2549.4 | $(13/2^{-})$ | 603.8 <mark>b</mark> 3 | ≈17 b | 1945.6 | $11/2^{(-)}$ | | | | |
| | | 1283.0 ^b 3 | 100 ^b 17 | 1266.4 | $9/2^{(-)}$ | Q ^C | | | |
| 2668.5 | (15/2 ⁻) | 119.1 ^b 1 | 100 ^b 8 | 2549.4 | (13/2 ⁻) | (M1) ^b | | 0.0712 10 | α (K)=0.0630 <i>9</i> ; α (L)=0.00695 <i>10</i> ; α (M)=0.001107 <i>16</i> α (N)=0.0001028 <i>15</i> |
| | | 723 ^b 1 | ≈17 ^b | 1945.6 | $11/2^{(-)}$ | | | | |
| 2942.1 | (17/2 ⁻) | 273.6 ^b 1 | 100 | 2668.5 | (15/2 ⁻) | M1 ^b | | 0.00820 12 | α (K)=0.00728 <i>10</i> ; α (L)=0.000784 <i>11</i> ; α (M)=0.0001247 <i>17</i> α (N)=1.164×10 ⁻⁵ <i>16</i> |
| 3089.0? | | 146.9 <mark>b</mark> 2 | 100 | 2942.1 | $(17/2^{-})$ | | | | |
| 3196.1? | | 254.0 ^b 2 | 100 | 2942.1 | $(17/2^{-})$ | | | | E_{γ} : from (α ,p2n γ), (α ,p γ). |
| 3333.5 | (19/2 ⁻) | 391.4 ^b 1 | 100 | 2942.1 | (17/2 ⁻) | (M1+E2) ^b | | 0.0049 15 | $\alpha(K)=0.0044 \ 13; \ \alpha(L)=4.8\times10^{-4} \ 16; \\ \alpha(M)=7.6\times10^{-5} \ 25 \\ \alpha(N)=7.0\times10^{-6} \ 22$ |
| 3526.9 | $(21/2^+)$ | 1249.0 <mark>b</mark> 8 | 100 | 2277.9 | $(17/2^+)$ | | | | |
| 3798.8 | $(21/2^{-})$ | 465.2 ^b 2 | 100 | 3333.5 | $(19/2^{-})$ | D ^b | | | |

[†] From Coulomb excitation, except as noted. Multipolarity and mixing ratio are based on $\gamma(\theta)$ measurements, and RUL, except where otherwise noted. [‡] From (d,n γ). [#] From (n,n' γ).

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From ENSDF

 $^{81}_{35}\mathrm{Br}_{46}$ -12

$\gamma(^{81}\text{Br})$ (continued)

[@] From ⁸¹Se β - decay (18.5 m).

[&] From ⁸¹Se β - decay (57.28 m).

^{*a*} From (p,p' γ).

^{*b*} From $(\alpha, p2n\gamma)$.

^{*c*} From $\gamma(\theta)$ in (d,n γ).

^d Weighted average of 1.25 +32–23 from $\alpha(K)exp$, $\alpha(L)exp$ in ⁸¹Se β^- decay (18.5 min) and +0.85 30 from $\gamma\gamma(\theta)$ in (p,γ) . Note: 276 $\gamma(\theta)$ in Coulomb excitation combined with 290 γ -276 $\gamma(\theta)$ in ⁸¹Se β^- decay (18.5 min), and 290 γ -276 $\gamma(\theta)$ alone, each gives inconsistent δ value.

^e Additional information 1.
 ^f Placement of transition in the level scheme is uncertain.

Level Scheme

Intensities: Relative photon branching from each level





Adopted Levels, Gammas Legend Level Scheme (continued) Intensities: Relative photon branching from each level $\exists \lim_{\substack{i \neq s \\ i \neq s}} e_{i \neq s} e$ $--- \rightarrow \gamma$ Decay (Uncertain) + 4259 0100 (9/2)+ 1948.3 1319.0 $11/2^{(-)}$ 1945.6 1040 $(3/2^-, 5/2, 7/2^-)$ 1885.3 $\frac{(3/2^{-})}{(5/2^{-})}$ 1866.4 1798.9 $(7/2^+)$ 8 1788.7 \$ ~? 1751.5 - ²- ²-- ²- ²-- ²- $\overline{}$ $(3/2^+)$ 4 ŝ -0-1696.0 (7/2-) 1681.2 -0,-0,-1670.7 S 1543 1587.4 -0 $\frac{1/2^+}{(3/2^-)}$ 8-5-8-8-8 1586.8 1,536.0 1 0-0 1543.2 1543.0 (9/2+) 1541.5 1536.0 ¥ (3/2-) 1535.9 $(11/2^+)$ 1522.4 9/2(-) 1266.4 _1<u>0</u>7<u>6</u>.<u>2</u> _₩ 5/2(-) 1023.7 7/2-1.05 ps 7 836.82 828.434 0.46 ps 7 ¥ 789.258 $\frac{5/2^+}{(5/2)}$ ¥ 0.54 ps 4 767.04 $(3/2)^{-}$ 650.003 2.6 ps 3 68 ps +*32–18* 0.76 ps *3* 566.124 538.194 $\frac{3/2^{-}}{1/2^{-},3/2}$ 275.986 9.7 ps 14 5/2-0.0 stable 3/2-

 $^{81}_{35}{
m Br}_{46}$



 $^{81}_{35}{\rm Br}_{46}$

Level Scheme (continued)

Intensities: Relative photon branching from each level



 $^{81}_{35}{
m Br}_{46}$



