## $^{58}$Ni($^{30}$Si,2αpγ) 1996Sm07

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

1996Sm07: E=134 MeV. Measured Eγ, Iγ, γγ, γγ(θ)(DCO) using EUROGAM array of 54 Ge detectors, including 24 'clover' detectors. Data interpreted with TRS calculations.

### $^{79}$Rb Levels

| E(level) | Jπ† | E(level) | Jπ† | E(level) | Jπ† | E(level) | Jπ† |
|---|---|---|---|---|---|---|---|
| 0.0‡ | 5/2+ | 2165.1& 6 | 17/2− | 5145.4a 8 | 27/2− | 9882.0a 14 | (39/2−) |
| 39.2& 5 | 3/2− | 2315.8‡ 7 | 21/2+ | 5287.5@ 17 | (27/2−) | 9892.1b 16 | (41/2+) |
| 96.5‡ 4 | 9/2+ | 2358.7b 10 | (17/2+) | 5463.5& 6 | 29/2− | 10028.4c 8 | 41/2− |
| 119.5b 5 | (5/2+) | 2510.6# 5 | 19/2+ | 5608.4b 13 | (29/2+) | 11511.0a 17 | (43/2−) |
| 146.4# 4 | 7/2+ | 2768.3a 6 | 19/2− | 6275.7‡ 7 | 33/2+ | 11519.1& 8 | (45/2−) |
| 173.8& 4 | 5/2− | 3111.6& 6 | 21/2− | 6346.7# 9 | 31/2+ | 11606.8# 18 | (43/2+) |
| 453.2a 4 | 7/2− | 3276.9b 11 | (21/2+) | 6573.9a 8 | 31/2− | 11666.5b 19 | (45/2+) |
| 597.4‡ 4 | 13/2+ | 3308.8@ 7 | (19/2−) | 6899.4& 6 | 33/2− | 11720.7c 8 | (45/2−) |
| 644.0# 4 | 11/2+ | 3457.6‡ 7 | 25/2+ | 6945.6b 14 | (33/2+) | 11833.7‡ 13 | (45/2+) |
| 679.8& 4 | 9/2− | 3686.8@ 8 | (21/2−) | 7910.7# 10 | (35/2+) | 13212a 5 | (47/2−) |
| 775.0b 7 | (9/2+) | 3700.1# 6 | 23/2+ | 7964.4‡ 7 | 37/2+ | 13525.1& 13 | (49/2−) |
| 1050.1a 5 | 11/2− | 3880.2a 7 | 23/2− | 8135.9a 10 | 35/2− | 13597.7c 13 | (49/2−) |
| 1349.3& 6 | 13/2− | 4151.5@ 10 | (23/2−) | 8341.4b 15 | (37/2+) | 13690.5b 21 | (49/2+) |
| 1353.3‡ 6 | 17/2+ | 4201.8& 6 | 25/2− | 8370.5& 7 | (37/2−) | 13790.8‡ 13 | |
| 1454.7# 4 | 15/2+ | 4352.9b 12 | (25/2+) | 8489.8c 7 | 37/2− | 13995.7‡ 16 | (49/2+) |
| 1518.0b 9 | 13/2+ | 4686.5@ 14 | (25/2−) | 9642.8# 14 | (39/2+) | 15556c 5 | (53/2−) |
| 1822.4a 6 | 15/2− | 4774.5‡ 7 | 29/2+ | 9827.7‡ 8 | 41/2+ | 15985b 5 | (53/2+) |
| 1852.2 4 | 17/2+ | 4954.9# 7 | 27/2+ | 9850.8& 8 | (41/2−) | | |

† As proposed by 1996Sm07 based on their γγ(θ)(DCO) data. See also Adopted Levels.
‡ Band(A): π3/2[431], α=+1/2.
# Band(a): π3/2[431], α=−1/2.
@ Band(B): ΔJ=1, 3-quasiparticle band.
& Band(C): π3/2[312], α=+1/2.
a Band(c): π3/2[312], α=−1/2.
b Band(D): π1/2[440], α=+1/2.
c Band(E): band related to π3/2[312], α=+1/2.

### γ($^{79}$Rb)

| Eγ† | Iγ | Ei(level) | Jiπ | Ef | Jfπ | Mult.‡ | Comments |
|---|---|---|---|---|---|---|---|
| 49.8 5 | | 146.4 | 7/2+ | 96.5 | 9/2+ | | |
| 96.5 5 | | 96.5 | 9/2+ | 0.0 | 5/2+ | | |
| 119.5 5 | | 119.5 | (5/2+) | 0.0 | 5/2+ | D | DCO=1.5 3 |
| 134.4 5 | | 173.8 | 5/2− | 39.2 | 3/2− | | |
| 146.8 5 | | 146.4 | 7/2+ | 0.0 | 5/2+ | | |
| 173.8 5 | | 173.8 | 5/2− | 0.0 | 5/2+ | D | DCO=1.8 3<br>Mult.: DCO consistent with ΔJ=0, dipole. |
| 226.3 5 | | 679.8 | 9/2− | 453.2 | 7/2− | | |
| 279.3 5 | 0.5 1 | 453.2 | 7/2− | 173.8 | 5/2− | | |

Continued on next page (footnotes at end of table)

## $^{58}$Ni($^{30}$Si,2$\alpha$p$\gamma$) 1996Sm07 (continued)

### $\gamma$($^{79}$Rb) (continued)

| $E_\gamma$[†] | $I_\gamma$ | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[‡] | Comments |
|---|---|---|---|---|---|---|---|
| 299.2 *10* | 0.4 *1* | 1349.3 | 13/2$^-$ | 1050.1 | 11/2$^-$ | | |
| 342.5 *10* | <0.5 | 2165.1 | 17/2$^-$ | 1822.4 | 15/2$^-$ | | |
| 356.6 *5* | 0.5 *1* | 453.2 | 7/2$^-$ | 96.5 | 9/2$^+$ | D | DCO=2.1 *5* |
| 370.2 *5* | | 1050.1 | 11/2$^-$ | 679.8 | 9/2$^-$ | | |
| 378.0 *5* | | 3686.8 | (21/2$^-$) | 3308.8 | (19/2$^-$) | (D) | DCO=1.5 *5* |
| 414.2 *5* | | 453.2 | 7/2$^-$ | 39.2 | 3/2$^-$ | | |
| 452.8 *5* | | 453.2 | 7/2$^-$ | 0.0 | 5/2$^+$ | | |
| 464.7 *5* | | 4151.5 | (23/2$^-$) | 3686.8 | (21/2$^-$) | | |
| 497.4 *5* | | 644.0 | 11/2$^+$ | 146.4 | 7/2$^+$ | | |
| 500.9 *1* | 100.0 *20* | 597.4 | 13/2$^+$ | 96.5 | 9/2$^+$ | | |
| 506.0 *5* | | 679.8 | 9/2$^-$ | 173.8 | 5/2$^-$ | | |
| 533.8 *5* | 2.2 *2* | 679.8 | 9/2$^-$ | 146.4 | 7/2$^+$ | (D) | DCO=1.6 *5* |
| 535 *1* | | 4686.5 | (25/2$^-$) | 4151.5 | (23/2$^-$) | | |
| 547.8 *3* | 3.8 *14* | 644.0 | 11/2$^+$ | 96.5 | 9/2$^+$ | | |
| 596.9 *5* | | 1050.1 | 11/2$^-$ | 453.2 | 7/2$^-$ | | |
| 601 *1* | | 5287.5 | (27/2$^-$) | 4686.5 | (25/2$^-$) | | |
| 655.5 *5* | | 775.0 | (9/2$^+$) | 119.5 | (5/2$^+$) | | |
| 669.6 *5* | | 1349.3 | 13/2$^-$ | 679.8 | 9/2$^-$ | | |
| 743.0 *5* | | 1518.0 | 13/2$^+$ | 775.0 | (9/2$^+$) | | |
| 755.9 *5* | | 1353.3 | 17/2$^+$ | 597.4 | 13/2$^+$ | | |
| 772.3 *3* | 3.7 *2* | 1822.4 | 15/2$^-$ | 1050.1 | 11/2$^-$ | | |
| 810.8 *3* | 6.9 *5* | 1454.7 | 15/2$^+$ | 644.0 | 11/2$^+$ | | |
| 815.8 *1* | 26.9 *10* | 2165.1 | 17/2$^-$ | 1349.3 | 13/2$^-$ | | |
| 840.7 *3* | 2.1 *1* | 2358.7 | (17/2$^+$) | 1518.0 | 13/2$^+$ | | |
| 857.1 *3* | 3.2 *10* | 1454.7 | 15/2$^+$ | 597.4 | 13/2$^+$ | | |
| 918.2 *5* | 1.4 *1* | 3276.9 | (21/2$^+$) | 2358.7 | (17/2$^+$) | | |
| 945.9 *3* | 3.8 *2* | 2768.3 | 19/2$^-$ | 1822.4 | 15/2$^-$ | | |
| 946.5 *1* | 23.2 *9* | 3111.6 | 21/2$^-$ | 2165.1 | 17/2$^-$ | | |
| 962.5 *1* | 64.7 *20* | 2315.8 | 21/2$^+$ | 1353.3 | 17/2$^+$ | Q | DCO=1.00 *24* |
| 1055.9 *3* | 4.8 *2* | 2510.6 | 19/2$^+$ | 1454.7 | 15/2$^+$ | | |
| 1076.0 *5* | 1.3 *1* | 4352.9 | (25/2$^+$) | 3276.9 | (21/2$^+$) | | |
| 1090.2 *1* | 19.3 *8* | 4201.8 | 25/2$^-$ | 3111.6 | 21/2$^-$ | | |
| 1111.9 *3* | 3.0 *2* | 3880.2 | 23/2$^-$ | 2768.3 | 19/2$^-$ | Q | DCO=1.00 *19* |
| 1141.8 *1* | 55.0 *12* | 3457.6 | 25/2$^+$ | 2315.8 | 21/2$^+$ | | |
| 1143.7 *3* | 2.8 *3* | 3308.8 | (19/2$^-$) | 2165.1 | 17/2$^-$ | | |
| 1189.5 *3* | 3.3 *2* | 3700.1 | 23/2$^+$ | 2510.6 | 19/2$^+$ | | |
| 1254.8 *1* | 12.1 *12* | 1852.2 | 17/2$^+$ | 597.4 | 13/2$^+$ | Q | DCO=1.14 *26* |
| 1254.8 *3* | 2.8 *2* | 4954.9 | 27/2$^+$ | 3700.1 | 23/2$^+$ | Q | DCO=1.08 *23* |
| 1255.5 *5* | 1.2 *1* | 5608.4 | (29/2$^+$) | 4352.9 | (25/2$^+$) | | |
| 1261.7 *1* | 18.4 *7* | 5463.5 | 29/2$^-$ | 4201.8 | 25/2$^-$ | Q | DCO=0.92 *16* |
| 1265.2 *3* | 2.8 *2* | 5145.4 | 27/2$^-$ | 3880.2 | 23/2$^-$ | Q | DCO=1.03 *19* |
| 1316.9 *1* | 32.7 *16* | 4774.5 | 29/2$^+$ | 3457.6 | 25/2$^+$ | | |
| 1337.2 *5* | 1.0 *1* | 6945.6 | (33/2$^+$) | 5608.4 | (29/2$^+$) | | |
| 1391.8 *5* | 1.9 *2* | 6346.7 | 31/2$^+$ | 4954.9 | 27/2$^+$ | Q | DCO=1.05 *21* |
| 1395.7 *5* | 0.6 *1* | 8341.4 | (37/2$^+$) | 6945.6 | (33/2$^+$) | | |
| 1428.5 *3* | 2.0 *2* | 6573.9 | 31/2$^-$ | 5145.4 | 27/2$^-$ | Q | DCO=1.19 *23* |
| 1435.8 *1* | 15.9 *7* | 6899.4 | 33/2$^-$ | 5463.5 | 29/2$^-$ | Q | DCO=0.95 *19* |
| 1471.1 *3* | 7.2 *19* | 8370.5 | (37/2$^-$) | 6899.4 | 33/2$^-$ | | |
| 1480.3 *3* | 4.0 *19* | 9850.8 | (41/2$^-$) | 8370.5 | (37/2$^-$) | | |
| 1501.2 *1* | 23.2 *15* | 6275.7 | 33/2$^+$ | 4774.5 | 29/2$^+$ | Q | DCO=0.96 *18* |
| 1538.6 *3* | 2.2 *1* | 10028.4 | 41/2$^-$ | 8489.8 | 37/2$^-$ | Q | DCO=1.2 *3* |
| 1550.7 *5* | 0.6 *1* | 9892.1 | (41/2$^+$) | 8341.4 | (37/2$^+$) | | |
| 1562.0 *5* | 1.4 *2* | 8135.9 | 35/2$^-$ | 6573.9 | 31/2$^-$ | Q | DCO=1.16 *26* |
| 1564.0 *5* | 1.2 *2* | 7910.7 | (35/2$^+$) | 6346.7 | 31/2$^+$ | | |
| 1590.4 *3* | 4.4 *4* | 8489.8 | 37/2$^-$ | 6899.4 | 33/2$^-$ | Q | DCO=0.95 *20* |

Continued on next page (footnotes at end of table)

## $^{58}$Ni($^{30}$Si,2$\alpha$p$\gamma$) 1996Sm07 (continued)

### $\gamma$($^{79}$Rb) (continued)

| $E_\gamma$[†] | $I_\gamma$ | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[‡] | Comments |
|---|---|---|---|---|---|---|---|
| 1629[#] *1* | 0.4 *1* | 11511.0 | (43/2$^-$) | 9882.0 | (39/2$^-$) | | |
| 1668.3 *3* | 3.4 *3* | 11519.1 | (45/2$^-$) | 9850.8 | (41/2$^-$) | | |
| 1688.6 *1* | 15.9 *12* | 7964.4 | 37/2$^+$ | 6275.7 | 33/2$^+$ | Q | DCO=0.93 *19* |
| 1692.3 *3* | 2.0 *5* | 11720.7 | (45/2$^-$) | 10028.4 | 41/2$^-$ | | |
| 1701[#] *4* | 0.4 *1* | 13212 | (47/2$^-$) | 11511.0 | (43/2$^-$) | | |
| 1732 *1* | 0.5 *1* | 9642.8 | (39/2$^+$) | 7910.7 | (35/2$^+$) | | |
| 1746[#] *1* | 0.5 *1* | 9882.0 | (39/2$^-$) | 8135.9 | 35/2$^-$ | | |
| 1774.4 *10* | 0.4 *1* | 11666.5 | (45/2$^+$) | 9892.1 | (41/2$^+$) | | |
| [x]1801.2 *3* | 2.3 *3* | | | | | | |
| 1863.3 *3* | 9.7 *8* | 9827.7 | 41/2$^+$ | 7964.4 | 37/2$^+$ | Q | DCO=1.0 *3* |
| 1877[#] *1* | 1.6 *2* | 13597.7 | (49/2$^-$) | 11720.7 | (45/2$^-$) | | |
| 1957.1[#] *3* | 2.7 *7* | 13790.8 | | 11833.7 | (45/2$^+$) | | |
| 1958[#] *4* | 1.4 *2* | 15556 | (53/2$^-$) | 13597.7 | (49/2$^-$) | | |
| 1964 *1* | <0.5 | 11606.8 | (43/2$^+$) | 9642.8 | (39/2$^+$) | | |
| 2006 *1* | 6.3 *7* | 11833.7 | (45/2$^+$) | 9827.7 | 41/2$^+$ | | |
| 2006 *1* | 2.8 *10* | 13525.1 | (49/2$^-$) | 11519.1 | (45/2$^-$) | | |
| 2024 *1* | 0.2 *1* | 13690.5 | (49/2$^+$) | 11666.5 | (45/2$^+$) | | |
| 2162 *1* | 1.9 *3* | 13995.7 | (49/2$^+$) | 11833.7 | (45/2$^+$) | | |
| 2294[#] *4* | <0.2 | 15985 | (53/2$^+$) | 13690.5 | (49/2$^+$) | | |

[†] Uncertainty assigned (evaluator) as 0.1 keV for I$\gamma$>10; 0.3 keV for I$\gamma$=2-10; 0.5 keV for I$\gamma$=0.5-2 and when no I$\gamma$ is given; 1-4 keV for very weak (I$\gamma$<0.5) $\gamma$ rays or for E$\gamma$ values listed to a nearest keV, based on a general statement by 1996Sm07.

[‡] R(DCO)≈1.0 suggests ΔJ=2, quadrupole (E2) transition.

[#] Placement of transition in the level scheme is uncertain.

[x] $\gamma$ ray not placed in level scheme.

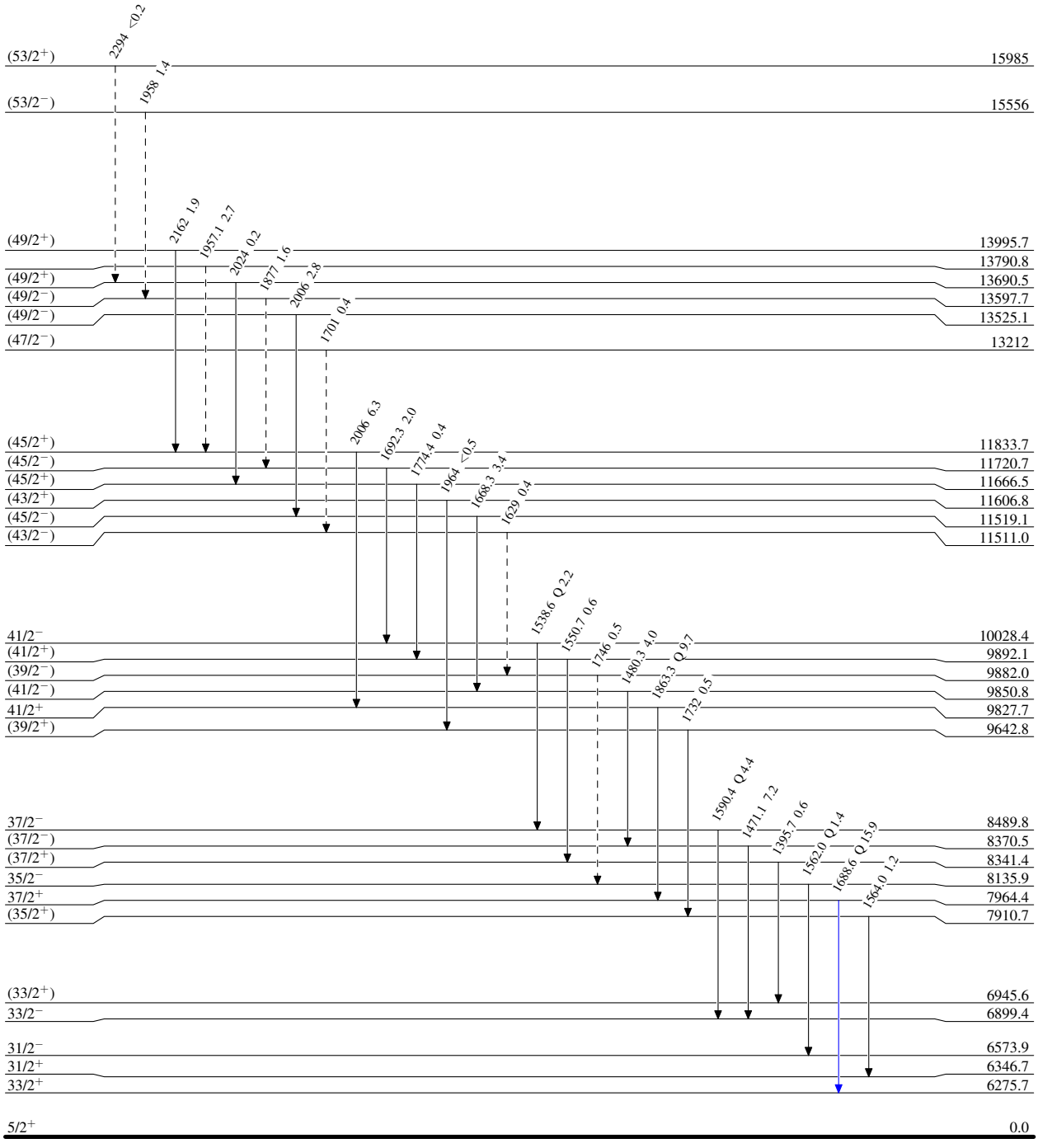
## $^{58}$Ni($^{30}$Si,2αpγ) 1996Sm07

Level Scheme

Intensities: Relative $I_\gamma$

Legend

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




$^{79}_{37}Rb_{42}$

**$^{58}$Ni($^{30}$Si,2αpγ) 1996Sm07**

Level Scheme (continued)

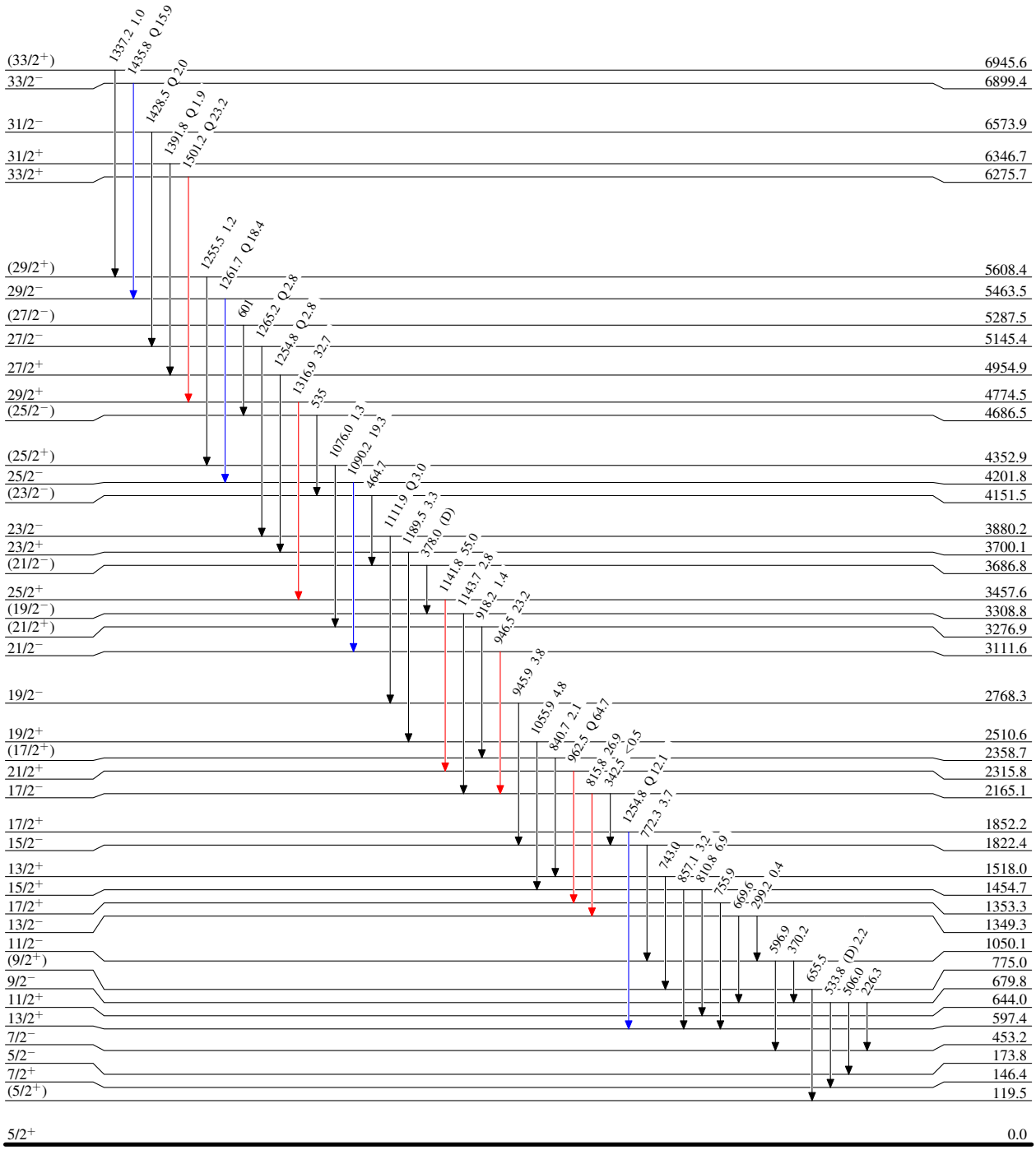
Intensities: Relative $I_\gamma$

Legend

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

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

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




$^{79}_{37}Rb_{42}$

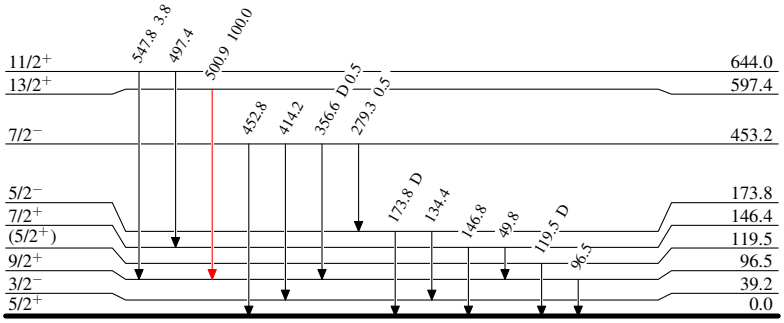
**$^{58}$Ni($^{30}$Si,2αpγ) 1996Sm07**

## Level Scheme (continued)

Intensities: Relative $I_\gamma$

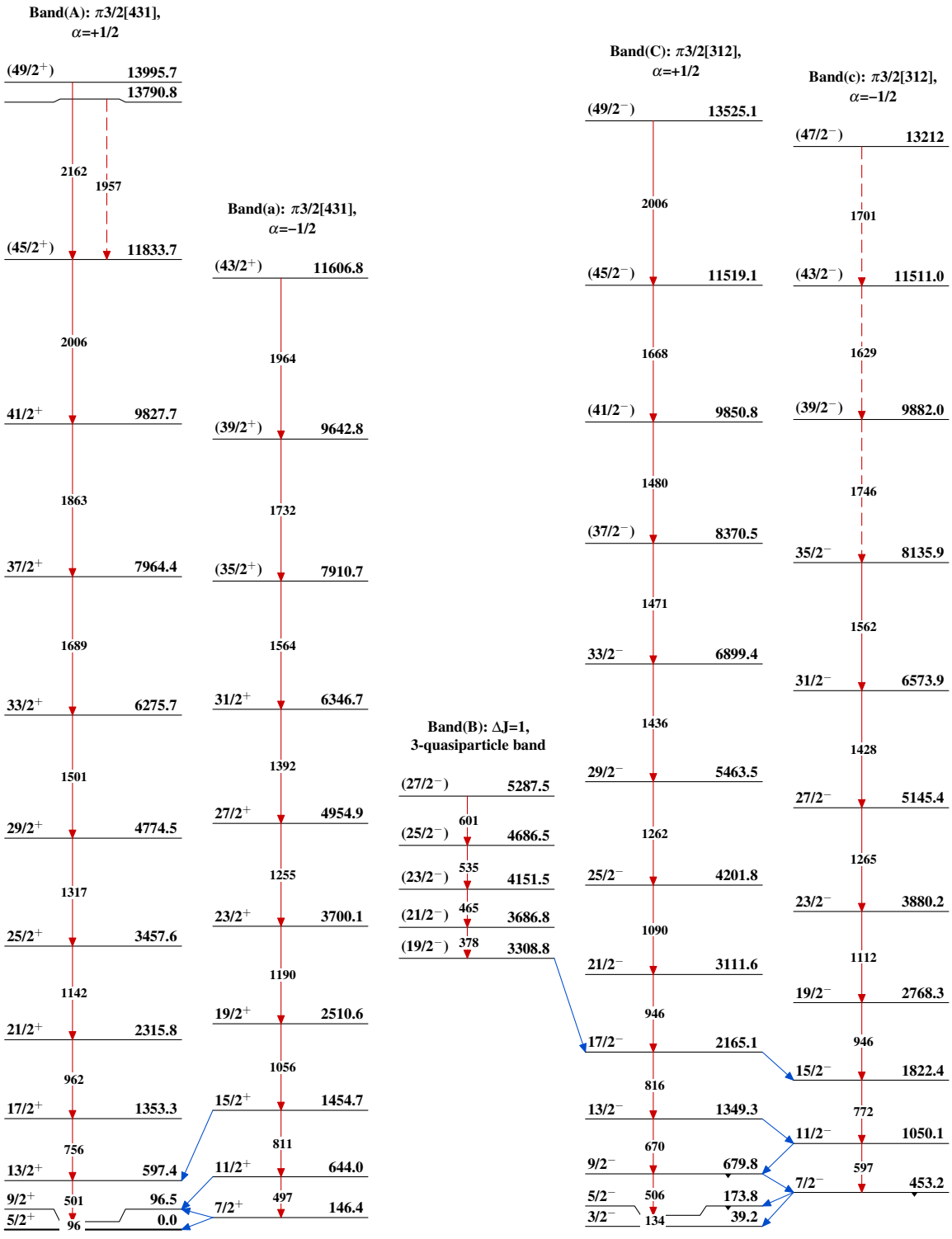
Legend

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



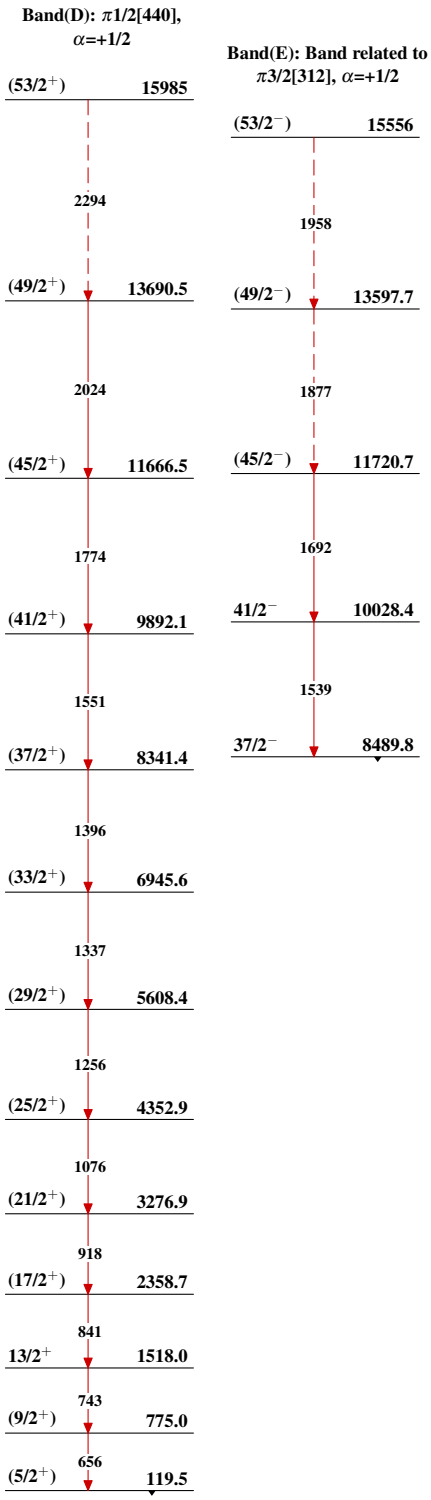

$^{79}_{37}Rb_{42}$

## $^{58}$Ni($^{30}$Si,2αpγ) 1996Sm07




$^{79}_{37}Rb_{42}$

## $^{58}$Ni($^{30}$Si,2αpγ) 1996Sm07 (continued)




$^{79}_{37}Rb_{42}$