## $^{58}$Ni($^{28}$Si,αpγ),$^{28}$Si($^{58}$Ni,αpγ) 1994Jo12,1993Mi11,1985Li12

History

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

Other: 1994RaZV.
Includes $^{58}$Ni($^{28}$Si,3p2nγ) (1985Li12).

1985Li12: E($^{28}$Si)=80-130 MeV, enriched $^{58}$Ni thick target and Pb-backed target, LEPS detector (8 angles, θ=0°−90°), Ge detector (8 angles, 90°−138°), NE213 scintillator (n detection), Si telescope at 0° (α, p detection); measured Eγ, Iγ, γγ and particle-γ coin, γ(θ) at E=95 MeV.

1993Mi11: E($^{28}$Si)=100 MeV; 15 or 20 Compton-suppressed Ge detector array, neutron and γ multiplicity filter.

1994Jo12: E($^{28}$Si)=95 MeV; 99.8% $^{58}$Ni target backed with Ta, six Compton-suppressed detectors; measured Eγ, Iγ, γγ coin, DCO ratios (θ=0° and 90°), $T_{1/2}$ (from DSA or recoil distance Doppler shift).

1994RaZV: $^{28}$Si($^{58}$Ni,αpγ), E($^{58}$Ni)=195 MeV; 99.6% enriched $^{28}$Si target; 20 Compton-suppressed Ge detectors in rings at 40°, 101°, 117°, 143°; measured Eγ, Iγ (unreported), recoil-γ and γγ coin, DCO ratios. $^{58}$Ni($^{28}$Si,αpγ), E($^{28}$Si)=95 MeV; 99.98%-enriched $^{58}$Ni target on Ta backing; 6 Compton-suppressed Ge detectors at 90°, one HPGe detector at 0°; measured γγ coin, DCO ratios, Doppler-broadened lineshapes of short-lived states.

### $^{81}$Y Levels

| E(level)‡ | Jπ† | $T_{1/2}$# | Comments |
|---|---|---|---|
| 0[e] | 5/2+ | | |
| 113.49[c] 9 | (3/2−) | ≤7& ns | |
| 149.72[d] 8 | 7/2+ | ≤7& ns | |
| 268.75[e] 8 | 9/2+ | ≤7& ns | |
| 288.72[b] 11 | (5/2−) | ≤7& ns | |
| 537.21[c] 13 | (7/2−) | ≤7& ns | |
| 608.34[a] 24 | | | |
| 683.51[d] 10 | 11/2+ | ≤7& ns | |
| 825.86[b] 12 | (9/2−) | ≤7& ns | |
| 839.34[e] 11 | 13/2+ | 3.0 ps 4 | |
| 1108.2[a] 3 | | | |
| 1167.53[c] 14 | (11/2−) | ≤7& ns | |
| 1482.80[d] 13 | 15/2+ | ≤7& ns | |
| 1530.62[b] 16 | (13/2−) | ≤7& ns | E(level): 1985Li12 value of 1536.68 is presumed to be a misprint. |
| 1540.4 4 | | | Level not adopted; deexciting γ is placed elsewhere in Adopted Levels, Gammas. |
| 1653.52[e] 13 | (17/2+) | 0.66 ps +21−14 | |
| 1783.5[a] 4 | | | |
| 1952.23[c] 23 | (15/2−) | ≤7& ns | |
| 2374.2[b] 5 | (17/2−) | ≤7& ns | |
| 2413.1 4 | | | Level not adopted; deexciting γ is placed elsewhere in Adopted Levels, Gammas. |
| 2416.8[d] | (19/2+) | | From 1993Mi11 only. Jπ and band assignment not adopted (level assigned to different band in ($^{32}$S,2αpγ)). |
| 2595.6[a] 6 | | | |
| 2687.02[e] 24 | (21/2+) | 0.34 ps +10−7 | |
| 2861.0[c] 4 | (19/2−) | ≤7& ns | |
| 3343.0[b] 7 | (21/2−) | | |
| 3560.8?[a] 7 | | | |
| 3894.7[c] 6 | (23/2−) | | |
| 3914.3[e] 3 | (25/2+) | 0.15 ps 6 | |
| 4440.5[b] 8 | (25/2−) | | |
| 5090.0?[c] 7 | (27/2−) | | |

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## $^{58}$Ni($^{28}$Si,$\alpha$p$\gamma$),$^{28}$Si($^{58}$Ni,$\alpha$p$\gamma$) 1994Jo12,1993Mi11,1985Li12 (continued)

### $^{81}$Y Levels (continued)

| E(level)‡ | J$^\pi$† | T$_{1/2}$# | Comments |
|---|---|---|---|
| 5271.4[e] 5 | (29/2$^+$) | ≈0.20 ps | T$_{1/2}$: without correction for feeding (1994Jo12). |
| 5664.0?[b] 12 | (29/2$^-$) | | |
| 6636.5[e] | (33/2$^+$) | | |
| 8089.5[e] | (37/2$^+$) | | |
| 9679.5?[@e] | (41/2$^+$) | | |
| 11380.5?[@e] | (45/2$^+$) | | |

† From 1994Jo12, based on measured DCO ratios and deduced band structure. $\pi$ for the proposed $\pi$=− bands is based on systematics in neighboring isotones. Values differ from those adopted only with regard to use of parentheses for all adopted $J^\pi$.
‡ From a least-squares fit to E$\gamma$. The values differ from those suggested in 1994Jo12 by ≤0.3 keV.
# From DSA measurements (1994Jo12), except as noted, apart from T$_{1/2}$ for 839.34 keV level which is from recoil distance Doppler shift (1994Jo12).
@ Level not adopted because this band member has been assigned at a different energy in a later, more extensive study using the ($^{32}$S,2$\alpha$p$\gamma$) reaction. For this reason, level is shown as tentative here.
& $\gamma\gamma$(t) and particle-$\gamma$(t) data from 1985Li12 indicate that T$_{1/2}$≤7 ns.
[a] Band(A): Band build on 609 level.
[b] Band(B): $K^\pi$=3/2$^-$, $\alpha$=+1/2 band Suggested configuration is 3/2[312] in 1994Jo12, 1994RaZV.
[c] Band(b): $K^\pi$=3/2$^-$, $\alpha$=−1/2 band See comment on signature partner band.
[d] Band(c): Probable 5/2[422], $\alpha$=−1/2 g.s. band.
[e] Band(C): Probable 5/2[422], $\alpha$=+1/2 g.s. band.

### $\gamma$($^{81}$Y)

| E$_\gamma$† | I$_\gamma$# | E$_i$(level) | J$_i^\pi$ | E$_f$ | J$_f^\pi$ | Mult.@ | Comments |
|---|---|---|---|---|---|---|---|
| 113.5 1 | 8.3 4 | 113.49 | (3/2$^-$) | 0 | 5/2$^+$ | D | A$_2$=−0.04 3 (1985Li12)<br>Other E$\gamma$: 113.29 3 (1985Li12). |
| 119.1 1 | 59.7 14 | 268.75 | 9/2$^+$ | 149.72 | 7/2$^+$ | D+Q | A$_2$=−0.05 3; A$_4$=+0.09 3 (1985Li12)<br>Other E$\gamma$: 118.87 2 (1985Li12).<br>DCO=0.93 6 (1994Jo12) datum is inconsistent with ΔJ=1.<br>67% 1 branch (1985Li12). |
| 149.7 1 | 100.0 20 | 149.72 | 7/2$^+$ | 0 | 5/2$^+$ | D | A$_2$=+0.09 2 (1985Li12)<br>Other E$\gamma$: 149.62 2 (1985Li12).<br>DCO=0.65 2 (1994Jo12). |
| 155.9 1 | 8.2 4 | 839.34 | 13/2$^+$ | 683.51 | 11/2$^+$ | D | A$_2$=−0.11 11 (1985Li12)<br>Other E$\gamma$: 155.29 2 (1985Li12).<br>DCO=0.65 12 (1994Jo12).<br>I$\gamma$(156):I$\gamma$(570.5+570.9)=10 1:90 1 (1985Li12). |
| 170.8 1 | 1.8 2 | 1653.52 | (17/2$^+$) | 1482.80 | 15/2$^+$ | | Other E$\gamma$: 170.5 5 (1985Li12).<br>1% 1 branch (1985Li12). |
| 175.3 1 | 34.8 12 | 288.72 | (5/2$^-$) | 113.49 | (3/2$^-$) | D | A$_2$=+0.08 4 (1985Li12)<br>Other E$\gamma$: 175.39 3 (1985Li12).<br>DCO=0.46 6 (1994Jo12). |
| 248.6 2 | 16.9 9 | 537.21 | (7/2$^-$) | 288.72 | (5/2$^-$) | D | A$_2$=+0.15 11 (1985Li12)<br>other E$\gamma$: 248.79 7 (1985Li12). E$\gamma$=248.15 in fig. 2 of 1985Li12 is presumed to be erroneous.<br>DCO=0.51 5 (1994Jo12). |
| 268.7 1 | 45.4 9 | 268.75 | 9/2$^+$ | 0 | 5/2$^+$ | E2 | A$_2$=+0.39 7; A$_4$=−0.12 7 (1985Li12)<br>E$\gamma$: other: 268.47 13 (1985Li12).<br>I$\gamma$: other: 33 1 if I$\gamma$(119)=67 1 (1985Li12).<br>Mult.: DCO=0.97 7 (1994Jo12). Not M2 from RUL.<br>33% 1 branch (1985Li12). |

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## $^{58}$Ni($^{28}$Si,$\alpha$p$\gamma$),$^{28}$Si($^{58}$Ni,$\alpha$p$\gamma$) 1994Jo12,1993Mi11,1985Li12 (continued)

### $\gamma$($^{81}$Y) (continued)

| $E_\gamma$[†] | $I_\gamma$[#] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[@] | Comments |
|---|---|---|---|---|---|---|---|
| 289.2 *3* | 16.1 *7* | 288.72 | (5/2$^-$) | 0 | 5/2$^+$ | | Other E$\gamma$: 289.09 *18* (1985Li12) for doublet.<br>Mult.: DCO=0.91 *13* (1994Jo12); consistent with a value expected for the $\Delta$J=0 transition indicated by deduced band structure. |
| 289.2 *3* | 6.5 *11* | 825.86 | (9/2$^-$) | 537.21 | (7/2$^-$) | | Other E$\gamma$: 289.09 *18* (1985Li12) for doublet.<br>Mult.: DCO=0.86 *11* (1994Jo12) is very high for what is expected (from deduced band structure) to be a D transition; suggests significant Q admixture. |
| 319.7 *3* | 4.8 *4* | 608.34 | | 288.72 | (5/2$^-$) | | |
| 341.6 *2* | 4.4 *6* | 1167.53 | (11/2$^-$) | 825.86 | (9/2$^-$) | | Other E$\gamma$: 341.93 *7* (1985Li12).<br>I$_\gamma$: I$\gamma$(342):I$\gamma$(630)=29 *3*:71 *3* (1985Li12).<br>Mult.: DCO=1.11 *16*, possibly contaminated by $^{83}$Y $\gamma$ (1994Jo12). A D $\Delta$J=1 transition is expected here. |
| 363.1 *2* | 2.9 *4* | 1530.62 | (13/2$^-$) | 1167.53 | (11/2$^-$) | | Other E$\gamma$: 363.62 *22* (1985Li12).<br>I$_\gamma$: I$\gamma$(363):I$\gamma$(704)=33 *3*:67 *3* (1985Li12). |
| 387.7 *2* | 4.3 *2* | 537.21 | (7/2$^-$) | 149.72 | 7/2$^+$ | | |
| 414.9 *1* | 17.0 *7* | 683.51 | 11/2$^+$ | 268.75 | 9/2$^+$ | D | A$_2$=+0.22 *12* (1985Li12)<br>E$_\gamma$: other: 414.87 *12* (1985Li12).<br>I$_\gamma$: other: 48 *1* if I$\gamma$(533)=52 *1* (1985Li12).<br>DCO=0.59 *4* (1994Jo12).<br>48% *1* branch (1985Li12). |
| 421.7[&] *5* | | 1952.23 | (15/2$^-$) | 1530.62 | (13/2$^-$) | | |
| 421.9[&] *5* | | 2374.2 | (17/2$^-$) | 1952.23 | (15/2$^-$) | | |
| 422.8 *4* | 7.5 *8* | 537.21 | (7/2$^-$) | 113.49 | (3/2$^-$) | | Other E$\gamma$: 423.50 *22* (1985Li12).<br>I$\gamma$(249):I$\gamma$(423)=71 *2*:29 *2* (1985Li12). |
| 484.0 *3* | 1.8 *1* | 1167.53 | (11/2$^-$) | 683.51 | 11/2$^+$ | | |
| 494.8 *5* | 4.5 *4* | 608.34 | | 113.49 | (3/2$^-$) | | |
| 499.9 *2* | 7.3 *7* | 1108.2 | | 608.34 | | | |
| 533.8 *2* | 15.3 *6* | 683.51 | 11/2$^+$ | 149.72 | 7/2$^+$ | E2 | A$_2$=+0.33 *7*; A$_4$=−0.08 *8* (1985Li12)<br>Other E$\gamma$: 534.0 *3* (1985Li12).<br>Mult.: DCO=1.00 *24* (1994Jo12). Not M2 from RUL.<br>52% *1* branch (1985Li12). |
| 537.5 *2* | 11.1 *19* | 825.86 | (9/2$^-$) | 288.72 | (5/2$^-$) | | Other E$\gamma$: 537.76 *15* (1985Li12).<br>I$_\gamma$: I$\gamma$(538):I$\gamma$(289)=28 *3*:72 *3* reported in 1985Li12 does not take into account the fact that the 289$\gamma$ is a doublet. |
| 556.8 *2* | 3.5 *2* | 825.86 | (9/2$^-$) | 268.75 | 9/2$^+$ | | Mult.: DCO=1.10 *18* (1994Jo12) implies a Q transition − inconsistent with the level scheme. |
| 570.5 *1* | 54.6 *21* | 839.34 | 13/2$^+$ | 268.75 | 9/2$^+$ | E2 | Other E: 570.92 *6* from 1985Li12; presumed to be for doublet.<br>Mult.: DCO=1.04 *5* (1994Jo12). A$_2$=+0.31 *3*; A$_4$=−0.08 *3* for doublet dominated by this transition (1985Li12). Not M2 from RUL. |
| 570.9 *4* | 1.8 *3* | 1108.2 | | 537.21 | (7/2$^-$) | | |
| 630.2 *2* | 11.9 *15* | 1167.53 | (11/2$^-$) | 537.21 | (7/2$^-$) | E2 | Other E$\gamma$: 630.56 *10* (1985Li12).<br>Mult.: DCO=1.02 *12* (1994Jo12). Not M2 from RUL. |
| 643.7 *2* | 5.8 *3* | 1482.80 | 15/2$^+$ | 839.34 | 13/2$^+$ | D | Other E$\gamma$: 644.86 *18* (1985Li12).<br>DCO=0.60 *9* (1994Jo12).<br>32% *4* branch (1985Li12). |
| 675.3 *3* | 8.6 *9* | 1783.5 | | 1108.2 | | | |
| 675.6 *2* | 4.0 *2* | 825.86 | (9/2$^-$) | 149.72 | 7/2$^+$ | | |
| 704.3 *3* | 11.1 *14* | 1530.62 | (13/2$^-$) | 825.86 | (9/2$^-$) | Q | Other E$\gamma$: 704.95 *13* (1985Li12).<br>DCO=1.15 *15* (1994Jo12). |
| 714.5 *3* | 3.3 *5* | 1540.4 | | 825.86 | (9/2$^-$) | | Presumed to be the same transition as that with E$\gamma$=713.2 *7* and placed elsewhere in ($^{32}$S,2$\alpha$p$\gamma$). |

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## $^{58}$Ni($^{28}$Si,$\alpha$p$\gamma$),$^{28}$Si($^{58}$Ni,$\alpha$p$\gamma$) 1994Jo12,1993Mi11,1985Li12 (continued)

### $\gamma$($^{81}$Y) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [#] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. [@] | Comments |
|---|---|---|---|---|---|---|---|
| 784.7 *2* | 11.0 *14* | 1952.23 | (15/2$^-$) | 1167.53 | (11/2$^-$) | | Other E$\gamma$: 784.9 *3* (1985Li12). |
| 799.3 *1* | 13.6 *6* | 1482.80 | 15/2$^+$ | 683.51 | 11/2$^+$ | | Other E$\gamma$: 800.30 *19* (1985Li12).<br>68% *4* branch (1985Li12). |
| 812.1 *4* | 5.6 *7* | 2595.6 | | 1783.5 | | | |
| 814.1 *1* | 50.4 *20* | 1653.52 | (17/2$^+$) | 839.34 | 13/2$^+$ | (Q) | $A_2$=+0.26 *5*; $A_4$=−0.03 *5* (1985Li12)<br>Other E$\gamma$: 814.41 *17* (1985Li12).<br>99% *1* branch (1985Li12).<br>DCO=0.83 *3*, possibly low due to contamination by an $^{83}$Y $\gamma$ (1994Jo12). |
| 843.6 *4* | 11.3 *14* | 2374.2 | (17/2$^-$) | 1530.62 | (13/2$^-$) | Q | Other E$\gamma$: 844.0 *3* (1985Li12).<br>DCO=1.13 *11* (1994Jo12). |
| 847.3 *2* | 2.7 *4* | 1530.62 | (13/2$^-$) | 683.51 | 11/2$^+$ | | |
| 872.7 *2* | 5.9 *8* | 2413.1 | | 1540.4 | | | Presumed to be the same transition as that with E$\gamma$=872.2 *9* and placed elsewhere in ($^{32}$S,2$\alpha$p$\gamma$). |
| 899.2 *3* | 6.3 *3* | 1167.53 | (11/2$^-$) | 268.75 | 9/2$^+$ | (D) | DCO=0.75 *13* (1994Jo12).<br>Should have been seen by 1985Li12, but was not. |
| 908.6 *3* | 7.4 *9* | 2861.0 | (19/2$^-$) | 1952.23 | (15/2$^-$) | | Other E$\gamma$: 910.1 *4* (1985Li12). |
| 934 | | 2416.8 | (19/2$^+$) | 1482.80 | 15/2$^+$ | | Observed by 1993Mi11 only. |
| 965.2[&] *4* | 4.6 *6* | 3560.8? | | 2595.6 | | | |
| 968.8 *5* | 10.0 *20* | 3343.0 | (21/2$^-$) | 2374.2 | (17/2$^-$) | | |
| 1033.5 *2* | 55.6 *23* | 2687.02 | (21/2$^+$) | 1653.52 | (17/2$^+$) | E2 | Other E$\gamma$: 1034 *1* (1985Li12).<br>Mult.: DCO=0.99 *4* (1994Jo12). Not M2 from RUL. |
| 1033.7 *4* | 8.2 *10* | 3894.7 | (23/2$^-$) | 2861.0 | (19/2$^-$) | | |
| 1097.5 *3* | 9.3 *12* | 4440.5 | (25/2$^-$) | 3343.0 | (21/2$^-$) | | |
| 1111.9 *8* | 4.9 *4* | 1952.23 | (15/2$^-$) | 839.34 | 13/2$^+$ | | |
| 1195.3[&] *4* | 5.7 *7* | 5090.0? | (27/2$^-$) | 3894.7 | (23/2$^-$) | | |
| 1208.0 *6* | 4.7 *4* | 2861.0 | (19/2$^-$) | 1653.52 | (17/2$^+$) | | |
| 1223.4[&] *9* | 4.0 *5* | 5664.0? | (29/2$^-$) | 4440.5 | (25/2$^-$) | | |
| 1227.3 *2* | 37.6 *15* | 3914.3 | (25/2$^+$) | 2687.02 | (21/2$^+$) | E2 | Other E$\gamma$: 1227 *3* (1985Li12).<br>Mult.: DCO=0.98 *6* (1994Jo12). Not M2 from RUL. |
| 1357.1 *4* | 17.2 *8* | 5271.4 | (29/2$^+$) | 3914.3 | (25/2$^+$) | E2 | Other E$\gamma$: 1360 *5* (1985Li12).<br>Mult.: DCO=1.18 *15* (1994Jo12). Not M2 from RUL. |
| 1365[‡] | | 6636.5 | (33/2$^+$) | 5271.4 | (29/2$^+$) | | |
| 1453[‡] | | 8089.5 | (37/2$^+$) | 6636.5 | (33/2$^+$) | | |
| 1590[‡] | | 9679.5? | (41/2$^+$) | 8089.5 | (37/2$^+$) | | |
| 1701[‡] | | 11380.5? | (45/2$^+$) | 9679.5? | (41/2$^+$) | | |

[†] From 1994Jo12, except as noted. E$\gamma$ values in 1985Li12 are, typically, quoted to significantly higher precision than those in 1994Jo12, but fewer lines were observed, so those data are given in comments; however, a comparison of the 1985Li12 data with those from 1994Jo12 indicates that E(155$\gamma$) from 1985Li12 is significantly low and data from 1985Li12 tend to be higher than those from 1994Jo12 for E$\gamma$ above about 300 keV. Also, considering the 1985Li12 data alone, the 414$\gamma$ datum is 4$\sigma$ from the least-squares adjusted value. Possibly the precision estimates in 1985Li12 are a little optimistic. It should be noted that E$\gamma$ data from the $^{58}$Ni($^{32}$S,2$\alpha$p$\gamma$) reaction are frequently significantly lower than data from 1994Jo12 or 1985Li12 at the higher energies. $\Delta$E is not stated by 1993Mi11; however E$\gamma$ from 1993Mi11 deviate from those of 1994Jo12 by as much as 3 keV for some lines reported in both studies.

[‡] From 1993Mi11; not reported in summary of measured properties for transitions in $\pi$=+ 5/2[422] band given in table 1 of 1994Jo12. Not confirmed in subsequent ($^{32}$S,2$\alpha$p$\gamma$) study which extended band to much higher energy than in 1994Jo12.

[#] Intensity relative to I(150$\gamma$)=100.0; from ($^{28}$Si,$\alpha$p$\gamma$) at E=95 MeV (1994Jo12), except as noted. 1985Li12 report I$\gamma$ (without uncertainties, apparently at same energy), but agreement with 1994Jo12 is poor and those data are not listed here. 1985Li12 also report photon branching from many levels. These values are given in comments on the relevant gammas; some are of higher precision than I$\gamma$ from 1994Jo12 and, except for the 268 and 827 levels, consistency between branching data from 1985Li12 and

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**$^{58}$Ni($^{28}$Si,$\alpha$p$\gamma$),$^{28}$Si($^{58}$Ni,$\alpha$p$\gamma$) 1994Jo12,1993Mi11,1985Li12 (continued)**

$\gamma(^{81}Y)$ (continued)

1994Jo12 is good. 1993Mi11 do not report I$\gamma$ data.

@ From measured DCO ratio (1994Jo12) and/or $\gamma(\theta)$ (1985Li12) (as listed in comment on relevant transition). Theoretical DCO values are 1.0 for $\Delta$J=2 and $\Delta$J=0, ≈0.45 for stretched D.

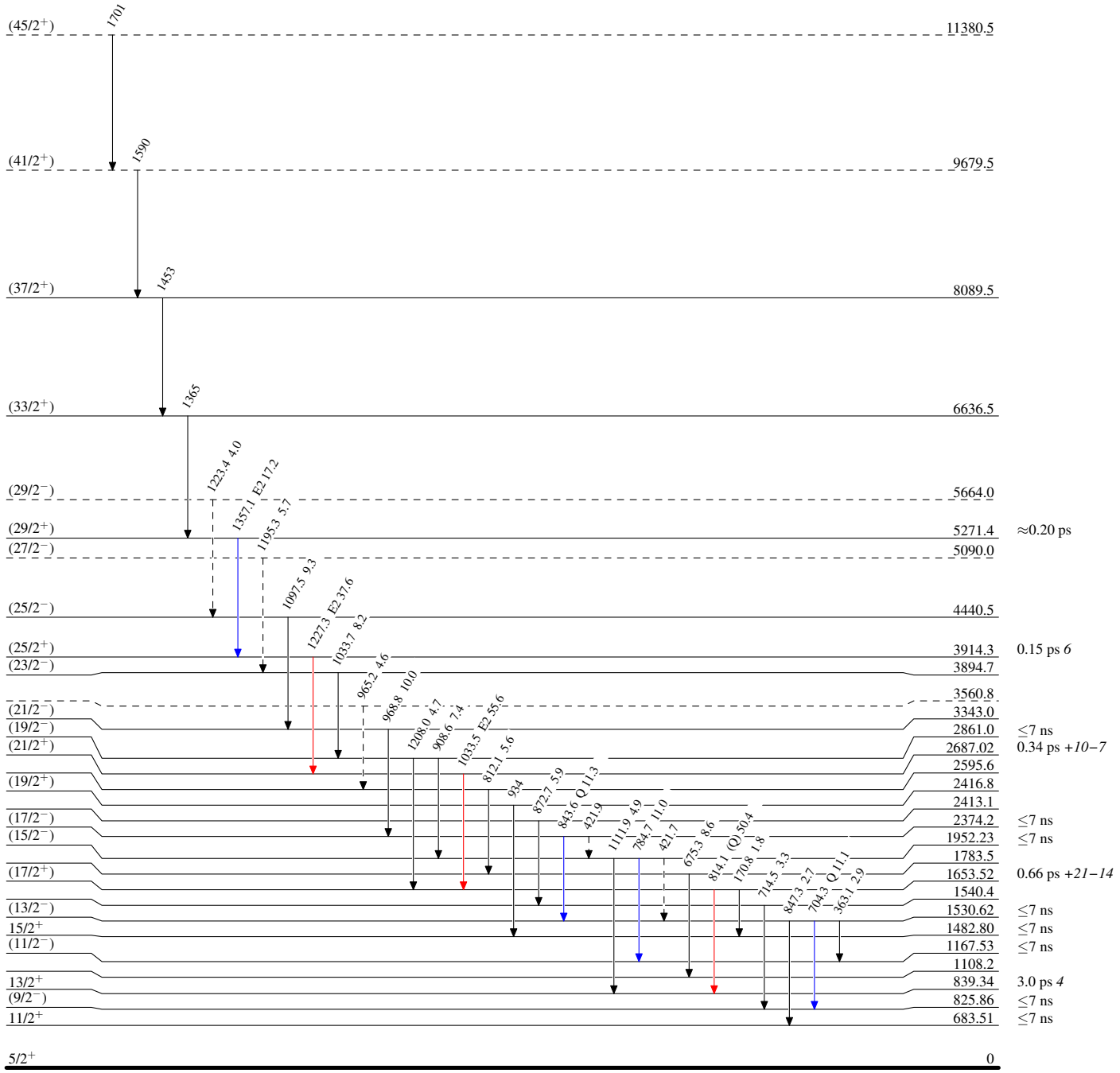
& Placement of transition in the level scheme is uncertain.

## $^{58}$Ni($^{28}$Si,αpγ),$^{28}$Si($^{58}$Ni,αpγ) 1994Jo12,1993Mi11,1985Li12

### Level Scheme

Intensities: relative Iγ from $^{58}$Ni($^{28}$Si,αpγ), E=95 MeV

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)




$^{81}_{39}Y_{42}$

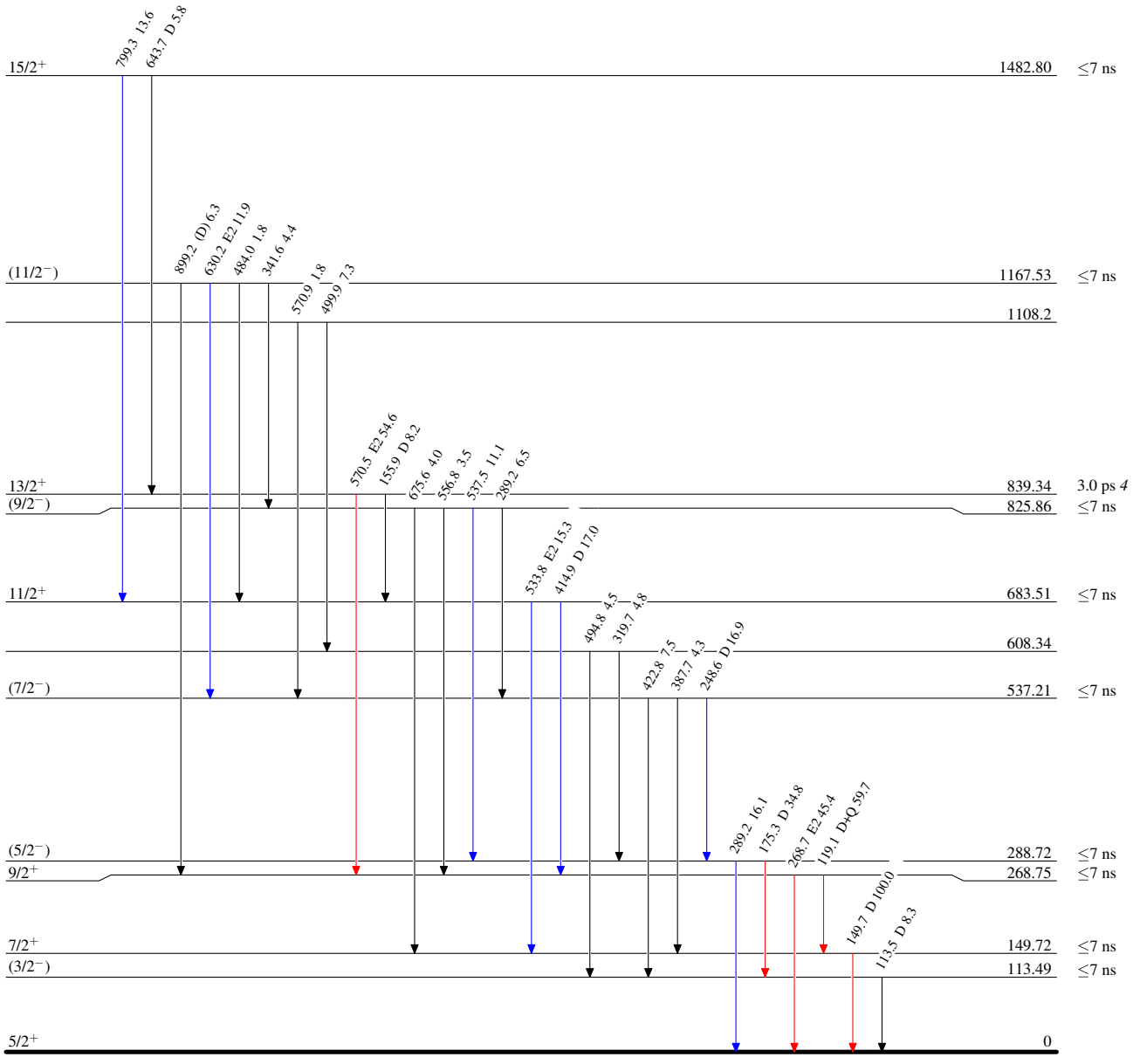
## $^{58}$Ni($^{28}$Si,αpγ),$^{28}$Si($^{58}$Ni,αpγ) 1994Jo12,1993Mi11,1985Li12

Legend

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

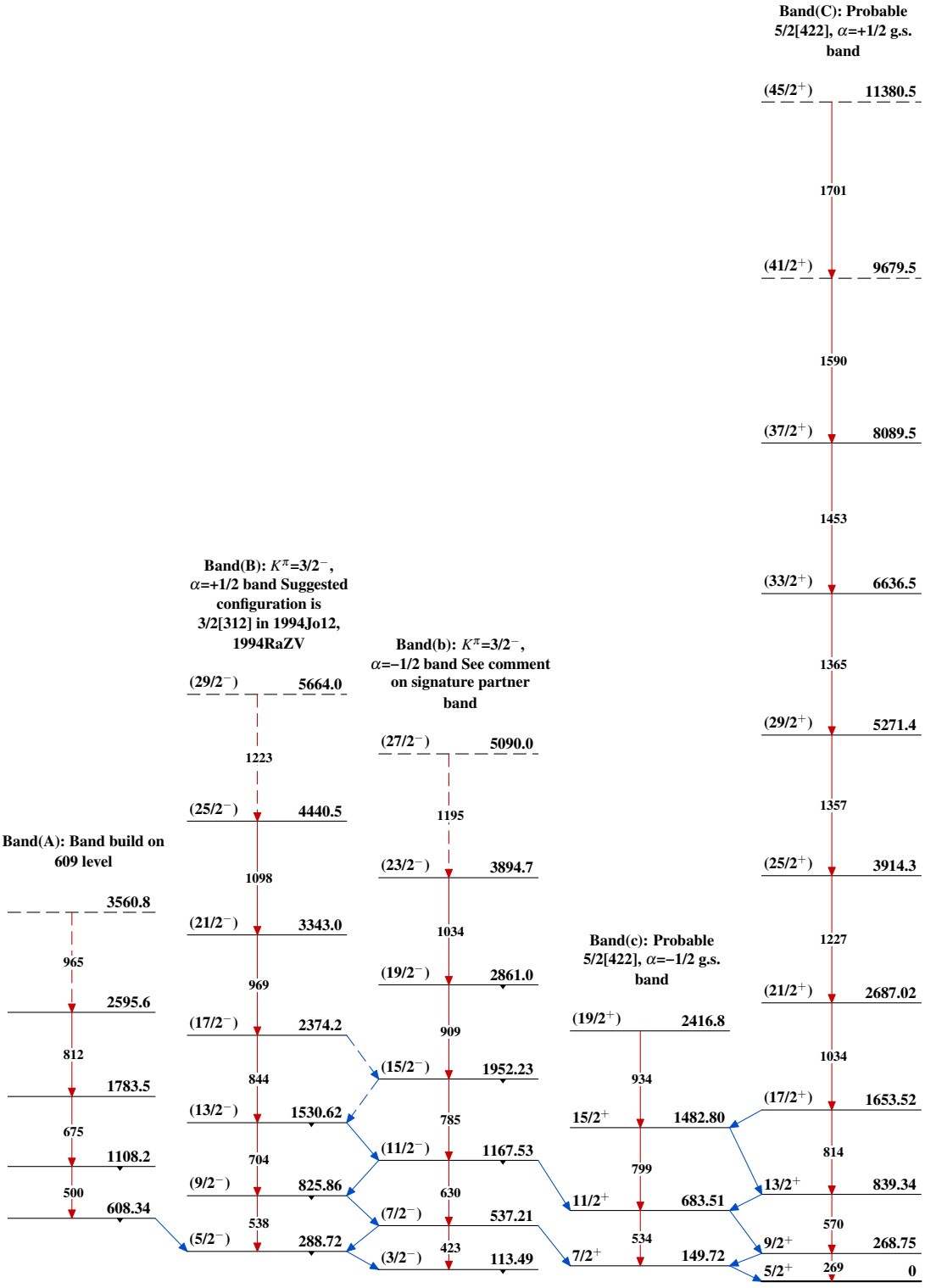
### Level Scheme (continued)

Intensities: relative Iγ from $^{58}$Ni($^{28}$Si,αpγ), E=95 MeV




$^{81}_{39}Y_{42}$

## $^{58}$Ni($^{28}$Si,αpγ),$^{28}$Si($^{58}$Ni,αpγ) 1994Jo12,1993Mi11,1985Li12




$^{81}_{39}Y_{42}$