## $^{65}$Cu($^{16}$O,2p2nγ),$^{64}$Ni($^{16}$O,p2nγ) 2001Ra33,1979Sc28

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Balraj Singh | ENSDF | 30-Sep-2020 |

2001Ra33: $^{65}$Cu($^{16}$O,2p2nγ) E=75 MeV. Measured Eγ, Iγ, γγ(t), lifetimes by Doppler Shift Attenuation method using an array of nine Compton-suppressed HPGe detectors. Cranked shell-model calculations.
1979Sc28: $^{64}$Ni($^{16}$O,p2nγ) E=60 MeV. Measured $T_{1/2}$ by recoil-distance Doppler-shift (RDDS) method.
Data are from 2001Ra33, unless otherwise stated.

### $^{77}$Br Levels

A level at 1788 deexciting by a 307γ (1979Sc28) has been omitted. The 307.7γ is now placed with 947 level (1989NaZZ,1993Do14).

| E(level)[†] | Jπ[#] | $T_{1/2}$[@] | Comments |
|---|---|---|---|
| 0.0[&] | 3/2− | | |
| 105.87[b] *10* | 9/2+ | 4.28 min *10* | %IT=100<br>$T_{1/2}$: from the Adopted Levels. |
| 129.75[‡] *21* | 5/2+ | | |
| 162.0[a] *3* | 5/2− | 498 ps *35* | |
| 276.22[‡] *24* | 3/2+ | | |
| 576.0[&] *3* | 7/2− | 9.8 ps *15* | |
| 639.95[b] *25* | 13/2+ | 9.8 ps *6* | |
| 782.32[‡c] *23* | (9/2)+ | 3.0 ps *6* | |
| 791.0[a] *4* | 9/2− | 4.3 ps *6* | |
| 1274.8[&] *4* | 11/2− | 2.8 ps *7* | |
| 1303.6[‡c] *3* | (13/2)+ | 2.8 ps *7* | |
| 1482.5[b] *4* | 17/2+ | 0.42 ps *14* | |
| 1539.3[a] *4* | 13/2− | | |
| 2022.1[&] *4* | 15/2− | | |
| 2044.9[‡c] *5* | (17/2)+ | <0.2 ps | |
| 2340.4[a] *5* | 17/2− | <0.2 ps | |
| 2550.8[b] *5* | 21/2+ | 0.16 ps *4* | $T_{1/2}$: other: <0.2 ps (1979Sc28). |
| 2793.0[&] *4* | 19/2− | | |
| 3201.2[a] *5* | 21/2− | | |
| 3728.9[&] *5* | 23/2− | | |
| 3775.8[b] *11* | 25/2+ | 0.118 ps *35* | |
| 4246.8[a] *6* | 25/2− | 0.21 ps *6* | |
| 5150.8[b] *15* | 29/2+ | 0.042 ps *21* | |
| 5516.8[a] *12* | 29/2− | 0.111 ps *35* | |
| 6692.8[b] *18* | 33/2+ | <0.069 ps | |
| 6978.8[a] *16* | 33/2− | <0.14 ps | |
| 8421.9[b] *21* | 37/2+ | | |

[†] From least-squares fit to Eγ data, assuming Δ(Eγ)=0.3 when Eγ quoted to a tenth of a keV, 1 keV otherwise.
[‡] Level from 1979Sc28.
[#] As proposed in 2001Ra33. The assignments are the same in Adopted Levels, except that parentheses have been added in the Adopted dataset, as strong arguments seem lacking.
[@] From recoil-distance Doppler-shift (RDDS) method in $^{64}$Ni($^{16}$O,p2nγ) (1979Sc28) for levels below 2500 keV. Above this

Continued on next page (footnotes at end of table)

## $^{65}$Cu($^{16}$O,2p2n$\gamma$),$^{64}$Ni($^{16}$O,p2n$\gamma$) 2001Ra33,1979Sc28 (continued)

### $^{77}$Br Levels (continued)

energy values are from DSAM (2001Ra33).

[&] Band(A): $\pi$=−,$\alpha$=−1/2.

[a] Band(a): $\pi$=−,$\alpha$=+1/2.

[b] Band(B): $\nu g_{9/2}$ band,$\alpha$=+1/2.

[c] Band(C): Band based on $(9/2)^+$,$\alpha$=+1/2.

### $\gamma(^{77}Br)$

| $E_\gamma$ | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. | $\alpha$[#] | Comments |
|---|---|---|---|---|---|---|---|
| 105.87[†] *10* | 105.87 | $9/2^+$ | 0.0 | $3/2^-$ | E3[†] | 6.30 | $\alpha$(K)=4.85 *7*; $\alpha$(L)=1.236 *19*; $\alpha$(M)=0.198 *3*; $\alpha$(N)=0.01486 *22*<br>Mult.: from the Adopted dataset. |
| 129.7[‡] | 129.75 | $5/2^+$ | 0.0 | $3/2^-$ | | | |
| 146.5[‡] | 276.22 | $3/2^+$ | 129.75 | $5/2^+$ | | | |
| 162.1 | 162.0 | $5/2^-$ | 0.0 | $3/2^-$ | | | |
| 215 | 791.0 | $9/2^-$ | 576.0 | $7/2^-$ | | | |
| 265 | 1539.3 | $13/2^-$ | 1274.8 | $11/2^-$ | | | |
| 276.2[‡] | 276.22 | $3/2^+$ | 0.0 | $3/2^-$ | | | |
| 318 | 2340.4 | $17/2^-$ | 2022.1 | $15/2^-$ | | | |
| 408 | 3201.2 | $21/2^-$ | 2793.0 | $19/2^-$ | | | |
| 414 | 576.0 | $7/2^-$ | 162.0 | $5/2^-$ | | | |
| 483.3[‡@] | 2022.1 | $15/2^-$ | 1539.3 | $13/2^-$ | | | |
| 484 | 1274.8 | $11/2^-$ | 791.0 | $9/2^-$ | | | |
| 518 | 4246.8 | $25/2^-$ | 3728.9 | $23/2^-$ | | | |
| 520.9[‡] | 1303.6 | $(13/2)^+$ | 782.32 | $(9/2)^+$ | | | |
| 534.4 | 639.95 | $13/2^+$ | 105.87 | $9/2^+$ | | | |
| 576.0 | 576.0 | $7/2^-$ | 0.0 | $3/2^-$ | | | |
| 629.0 | 791.0 | $9/2^-$ | 162.0 | $5/2^-$ | | | |
| 652.5[‡] | 782.32 | $(9/2)^+$ | 129.75 | $5/2^+$ | | | |
| 664.1[‡] | 1303.6 | $(13/2)^+$ | 639.95 | $13/2^+$ | | | |
| 676.1[‡] | 782.32 | $(9/2)^+$ | 105.87 | $9/2^+$ | | | |
| 685 | 791.0 | $9/2^-$ | 105.87 | $9/2^+$ | | | |
| 698.9 | 1274.8 | $11/2^-$ | 576.0 | $7/2^-$ | | | |
| 741.3[‡] | 2044.9 | $(17/2)^+$ | 1303.6 | $(13/2)^+$ | | | |
| 747.3 | 2022.1 | $15/2^-$ | 1274.8 | $11/2^-$ | | | |
| 748.3 | 1539.3 | $13/2^-$ | 791.0 | $9/2^-$ | | | |
| 770.9 | 2793.0 | $19/2^-$ | 2022.1 | $15/2^-$ | | | |
| 801.1 | 2340.4 | $17/2^-$ | 1539.3 | $13/2^-$ | | | |
| 842.5 | 1482.5 | $17/2^+$ | 639.95 | $13/2^+$ | | | |
| 860.8 | 3201.2 | $21/2^-$ | 2340.4 | $17/2^-$ | | | |
| 899 | 1539.3 | $13/2^-$ | 639.95 | $13/2^+$ | | | |
| 936.0 | 3728.9 | $23/2^-$ | 2793.0 | $19/2^-$ | | | |
| 1045.6 | 4246.8 | $25/2^-$ | 3201.2 | $21/2^-$ | | | |
| 1068.3 | 2550.8 | $21/2^+$ | 1482.5 | $17/2^+$ | | | |
| 1225 | 3775.8 | $25/2^+$ | 2550.8 | $21/2^+$ | | | |
| 1270 | 5516.8 | $29/2^-$ | 4246.8 | $25/2^-$ | | | |
| 1310.4 | 2793.0 | $19/2^-$ | 1482.5 | $17/2^+$ | | | |
| 1375 | 5150.8 | $29/2^+$ | 3775.8 | $25/2^+$ | | | |
| 1382 | 2022.1 | $15/2^-$ | 639.95 | $13/2^+$ | | | |
| 1462 | 6978.8 | $33/2^-$ | 5516.8 | $29/2^-$ | | | |
| 1542 | 6692.8 | $33/2^+$ | 5150.8 | $29/2^+$ | | | |
| 1729 | 8421.9 | $37/2^+$ | 6692.8 | $33/2^+$ | | | |

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## $^{65}$Cu($^{16}$O,2p2n$\gamma$),$^{64}$Ni($^{16}$O,p2n$\gamma$) 2001Ra33,1979Sc28 (continued)

### $\gamma$($^{77}$Br) (continued)

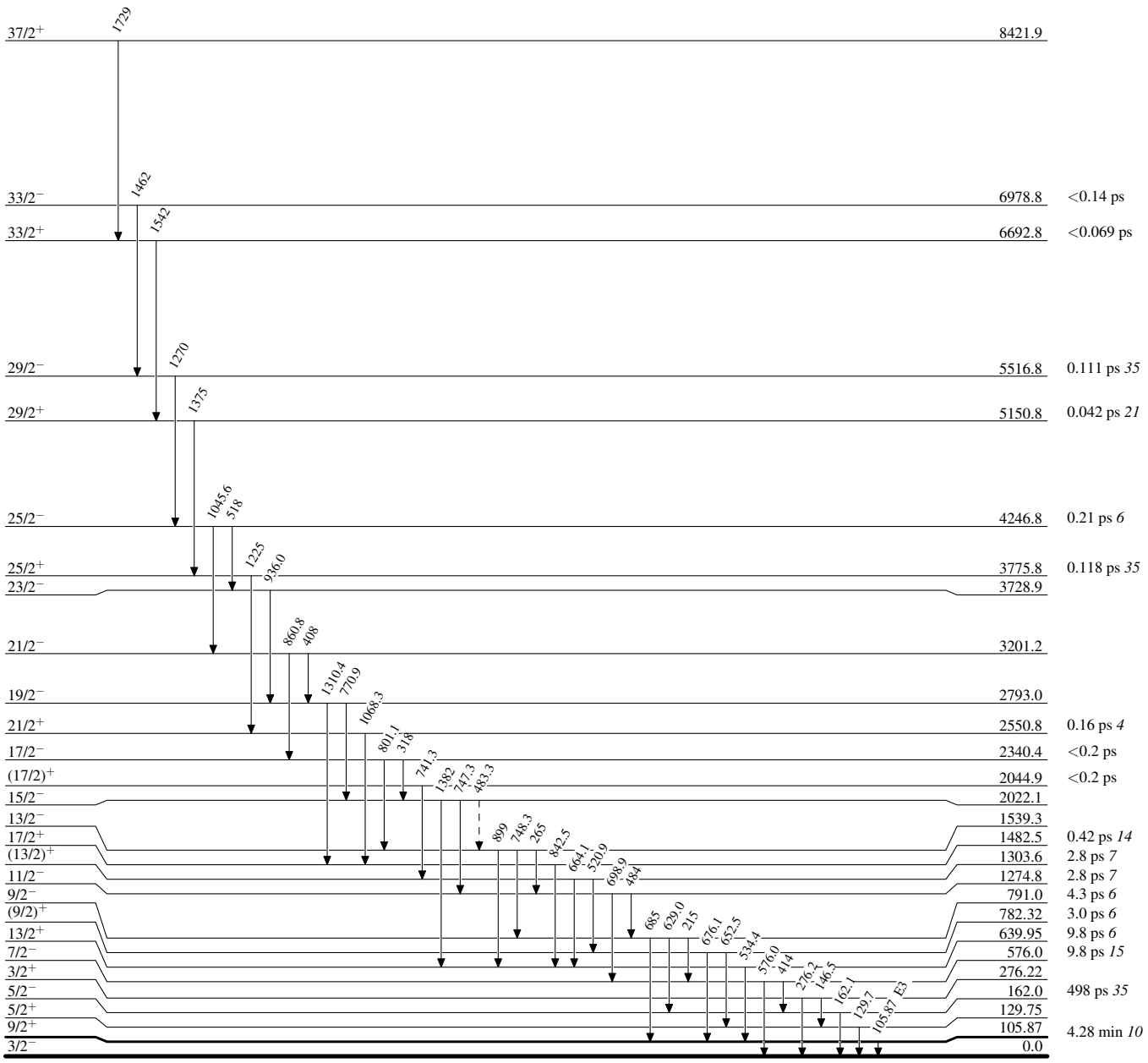
† From Adopted Gammas.
‡ From 1979Sc28.
# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on $\gamma$-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
@ Placement of transition in the level scheme is uncertain.

Legend

**$^{65}$Cu($^{16}$O,2p2nγ),$^{64}$Ni($^{16}$O,p2nγ) 2001Ra33,1979Sc28**

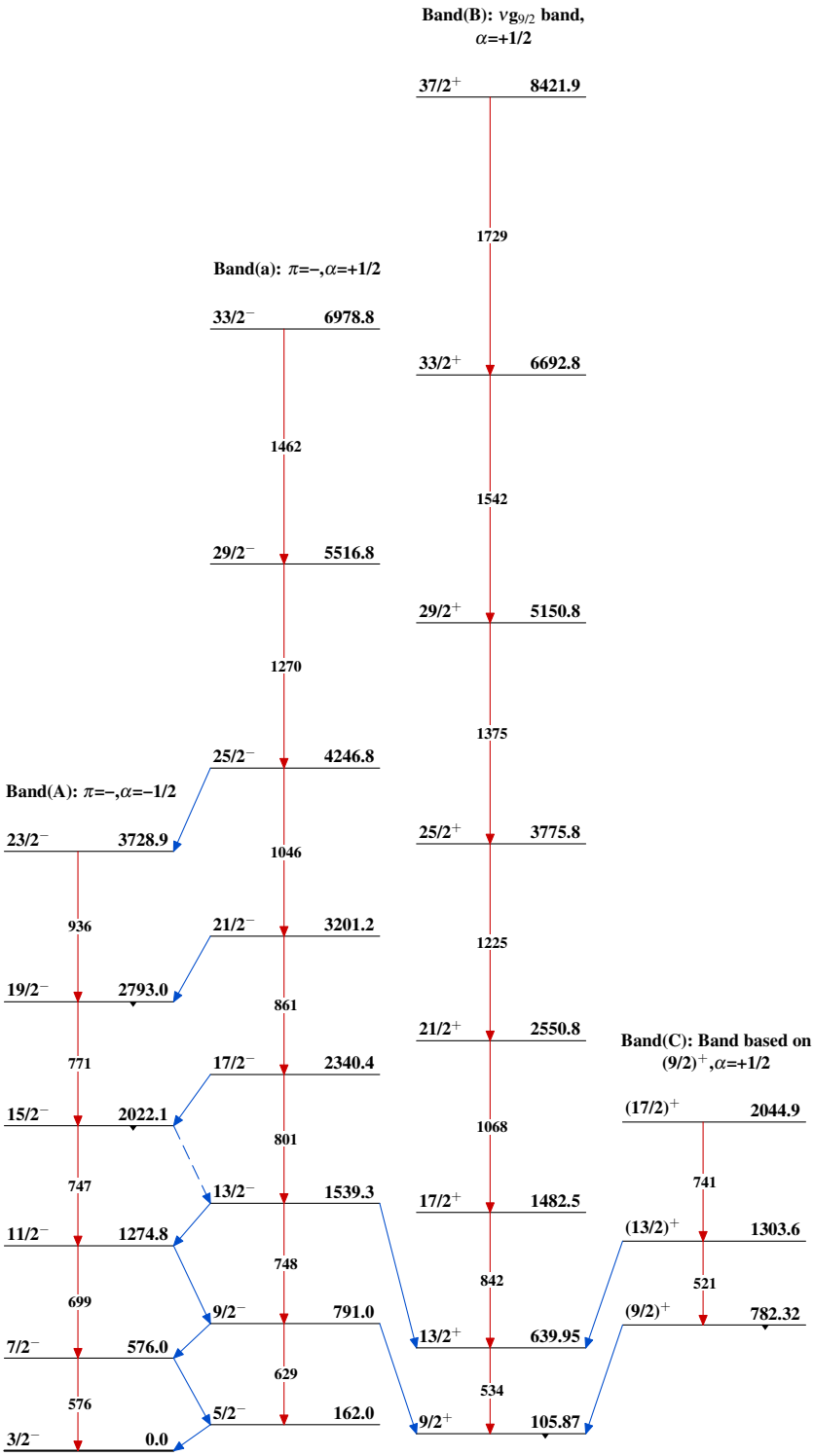
Level Scheme

γ Decay (Uncertain)




$^{77}_{35}Br_{42}$

**$^{65}$Cu($^{16}$O,2p2nγ),$^{64}$Ni($^{16}$O,p2nγ) 2001Ra33,1979Sc28**




$^{77}_{35}Br_{42}$