## $^{135}$Pr IT decay (105 μs) 1973Co32

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
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Parent: $^{135}$Pr: E=357.6 *5*; $J^\pi$=(11/2$^-$); $T_{1/2}$=105 μs *10*; %IT decay=100

1973Co32: isomer produced in reaction $^{127}$I($^{12}$C,4nγ) at 88 MeV. Measured Eγ, Iγ, γ(t), I(x ray).

This isomer is also populated in $^{135}$Nd ε decay and in in-beam γ-ray studies which provide better branching ratios given in 'Adopted Levels, gammas'.

Intensity balances at 245.3 and 41.5 levels are poor which implies that γ-ray intensities are not known well in this study.

Total decay energy of 375 keV *25* calculated (by RADLIST code) from level scheme is in agreement with the expected value of 358 keV.

### $^{135}$Pr Levels

| E(level) | $J^\pi$[†] | $T_{1/2}$ | Comments |
|---|---|---|---|
| 0.0 | 3/2$^{(+)}$ | | |
| 41.5 *4* | 5/2$^{(+)}$ | | |
| 245.3 *5* | 7/2$^{(+)}$ | | |
| 357.6 *5* | (11/2$^-$) | 105 μs *10* | $T_{1/2}$: from γ(t) (1973Co32). |

[†] From 'Adopted Levels'.

### γ($^{135}$Pr)

Iγ normalization: from Σ(I(γ+ce) of 112.4γ and 316.6γ)=100.

I($K_\alpha$ x ray)=530 *106* relative to 220 for 41.5γ.

| $E_\gamma$ | $I_\gamma$[‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[†] | δ[†] | α[#] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 41.5 *4* | 173 *28* | 41.5 | 5/2$^{(+)}$ | 0.0 | 3/2$^{(+)}$ | M1(+E2) | <0.15 | 3.1 *6* | α(L)=2.5 *5*; α(M)=0.53 *11*; α(N+..)=0.14 *3*<br>α(N)=0.116 *24*; α(O)=0.018 *4*; α(P)=0.001085 *18*<br>$I_\gamma$: this γ-ray is not well resolved from x rays, thus its photon intensity of 220 *33* given by 1973Co32 is not reliably determined. The value given here is deduced (by evaluators) from intensity balance.<br>Mult.: α(exp)=(1.7 *5*) from 1973Co32 is consistent with M1. |
| 112.4 *4* | 64 *5* | 357.6 | (11/2$^-$) | 245.3 | 7/2$^{(+)}$ | M2 | | 8.26 | α(K)exp<8.0; α(exp)>8.2 *10*<br>α(K)=6.46 *10*; α(L)=1.408 *20*; α(M)=0.312 *5*; α(N+..)=0.0817 *12*<br>α(N)=0.0699 *10*; α(O)=0.01101 *16*; α(P)=0.000707 *10* |
| 203.8 *3* | 590 *30* | 245.3 | 7/2$^{(+)}$ | 41.5 | 5/2$^{(+)}$ | M1 | | 0.1762 | α(K)=0.1503 *21*; α(L)=0.0205 *3*; α(M)=0.00431 *6*; α(N+..)=0.001130 *16*<br>α(N)=0.000964 *14*; α(O)=0.0001553 *22*; α(P)=1.149×10$^{-5}$ *17*<br>Mult.: α(exp)=(0.06 *12*) from 1973Co32 gives dipole or E2. |
| 245.6[@] *10* | <50 | 245.3 | 7/2$^{(+)}$ | 0.0 | 3/2$^{(+)}$ | (E2) | | 0.0963 | α(K)=0.0748 *11*; α(L)=0.01686 *25*; |

Continued on next page (footnotes at end of table)

## $^{135}$Pr IT decay (105 μs) 1973Co32 (continued)

### γ($^{135}$Pr) (continued)

| $E_\gamma$ | $I_\gamma$[‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[†] | α[#] | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | α(M)=0.00369 *6*; α(N+..)=0.000932 *14*<br>α(N)=0.000807 *12*; α(O)=0.0001198 *18*;<br>α(P)=4.71×10$^{-6}$ *7* |
| (316.6 *1*) | 15 *3* | 357.6 | (11/2$^-$) | 41.5 | 5/2$^{(+)}$ | E3 | 0.1603 | α(K)=0.1082 *16*; α(L)=0.0406 *6*; α(M)=0.00916 *13*;<br>α(N+..)=0.00229 *4*<br>α(N)=0.00200 *3*; α(O)=0.000288 *4*; α(P)=7.32×10$^{-6}$ *11*<br>$E_\gamma$: from 'adopted gammas'.<br>$I_\gamma$: deduced from branching ratio in 'adopted gammas'. |

[†] From the Adopted Gammas, unless otherwise stated.
[‡] For absolute intensity per 100 decays, multiply by 0.164 *15*.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with "Frozen Orbitals" approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[@] Placement of transition in the level scheme is uncertain.