^{84}Sr(p,nγ) 2005Io02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	N. Nica and M. Bostan	NDS 110,2815 (2009)	30-Sep-2009

2005Io02: ^{84}Sr(p,n), E=13.5 MeV. Measured Eγ, Iγ, γγ, γγ(t), lifetimes using large volumes and planar HPGe detectors and NaI(Tl) crystals. Recorded prompt spectra (time gate of 20 ns centered on the beam pulse), and delayed spectra (time gate 60-220 ns after the beam pulse, corrected for background from long-lived activities by subtracting a spectrum recorded In the time interval 3060-3220 ns after the beam pulse). Only the delayed γ′s were analyzed and placed In a level scheme. Measured g factors by time-differential perturbed angular distributions In an external magnetic field.

^{84}Y Levels

E(level)†	Jπ	$T_{1/2}$	Comments
0.0‡	(6+)#	39.5# min *8*	
67.0‡ *2*	1+#	4.6# s *2*	Additional information 1.
112.35 *17*	(4+)	79@ ns *2*	g=+0.578 *7* (2005Io02) E(level): existence of isomer deduced by observation of 112.4γ(t) decay curve with two components. Jπ: ΔJ=0 γ from (4−), 210 keV; π=(+) from E2 γ to (6+), g.s.. Possible configuration=π1g9/2⊗ν1g9/2.
130.40 *17*	(2−)		Jπ: E2 γ from (4−), 210 keV; (E1) γ to 1+, 67 keV.
148.65 *17*	(5+)		Jπ: (E1) γ from (4−), 210 keV and (D(+Q)) γ to (6+), g.s..
210.40 *17*	(4−)	292@ ns *10*	g=+0.234 *6* (2005Io02) E(level): existence of isomer deduced by observation of prompt and delayed γ′s, γ(t) measurements for the delayed γ′s (61.7, 63.4, 80.9, 98.1, 112.4, and 148.6), and coincidence measurement (112.4γ and 61.7γ, gated by the 98.1γ and 148.6γ, respectively). Jπ: 0 to 4 from E2 and D γ cascade to 1+, 67 keV; 4 to 8 from D plus D γ cascade to (6+) g.s.. π=(−) from (E1) γ to (4+), 112 keV. Configuration=π3/2[301]⊗ν5/2[422].

† From least-squares fit to Eγ′s.
‡ The ordering of the (6+) and 1+ states proposed by 2005Io02 is the same as that proposed by 2000Do10 (^{84}Zr ε decay dataset), but obtained independently (except for the 112γ, the reactions and details of the level schemes are different). This supersedes the reversed ordering, with the 1+ as g.s., and with (5−) (instead of (6+)) for the 39.5-min activity, adopted previously (1997Tu02 and references therein).
# From Adopted Levels.
@ Deduced from γγ(t) spectra (2005Io02).

γ(^{84}Y)

Eγ	Iγ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α†	Comments
x41.1#								
x44.6#								
x61.3#								
61.7 *2*	42 *4*	210.40	(4−)	148.65	(5+)	(E1)	0.440 *8*	Mult.: D γ from I(148γ)/I(61γ) ratio; according to 2005Io02, (E1) is more likely, based on B(E1)(W.u.)=1.16×10−6 *14*, similar to values reported for E1 transitions in this region (while B(M1)(W.u.) is far from the usual values for M1 transitions in this region).
63.4 *2*	7.9 *8*	130.40	(2−)	67.0	1+	(E1)	0.407 *7*	Mult.: D from I(63γ)/I(80γ) ratio; (E1) more likely based on Δπ=(yes) from level scheme.

Continued on next page (footnotes at end of table)

^{84}Sr(p,nγ) 2005Io02 (continued)

γ(^{84}Y) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α†	Comments
80.0 *2*	4.0 *6*	210.40	(4$^-$)	130.40	(2$^-$)	E2	2.40	
x85.1#								
x92.4#								
98.1 *2*	100 *9*	210.40	(4$^-$)	112.35	(4$^+$)	(E1)	0.1137	Mult.: D γ from I(112γ)/I(98γ) ratio; ΔJ=0 supported by angular distribution coefficient A_2>0; according to 2005Io02, (E1) is more likely, based on B(E1)(W.u.)=6.9×10^{-7} *8*, similar to values reported for E1 transitions in this region (while B(M1)(W.u.) is far from the usual values for M1 transitions in this region).
112.4 *2*	69 *8*	112.35	(4$^+$)	0.0	(6$^+$)	E2	0.694	I_γ: Deduced from a delayed spectrum when the 79-ns component is totally decayed; corrected for its own lifetime (2005Io02).
x116.4#								
x131.4#								
148.6 *2*	58 *6*	148.65	(5$^+$)	0.0	(6$^+$)	(M1(+E2))		Mult.: D or E2 γ from I(148γ)/I(61γ) ratio; ΔJ=1, (D) from angular distribution coefficient A_2<0 (ΔJ=1, D+Q not excluded); (M1(+E2)) based on Δπ=(no) from level scheme.
x151.1#								
x163.6#								
x168.0#								
x169.4#								
x173.9#								
x216.1#								

† Additional information 2.

‡ Deduced by 2005Io02 from γ-ray experimental intensity ratios for the three groups of two-by-two coincident transitions with same I(γ+ce), compared to ratios calculated assuming either of the M1, E1, and E2 multipolarities for the two transitions. For some γ's extra arguments are given in the table comments when needed.

Unplaced prompt γ from spectral figure of 2005Io02.

x γ ray not placed in level scheme.

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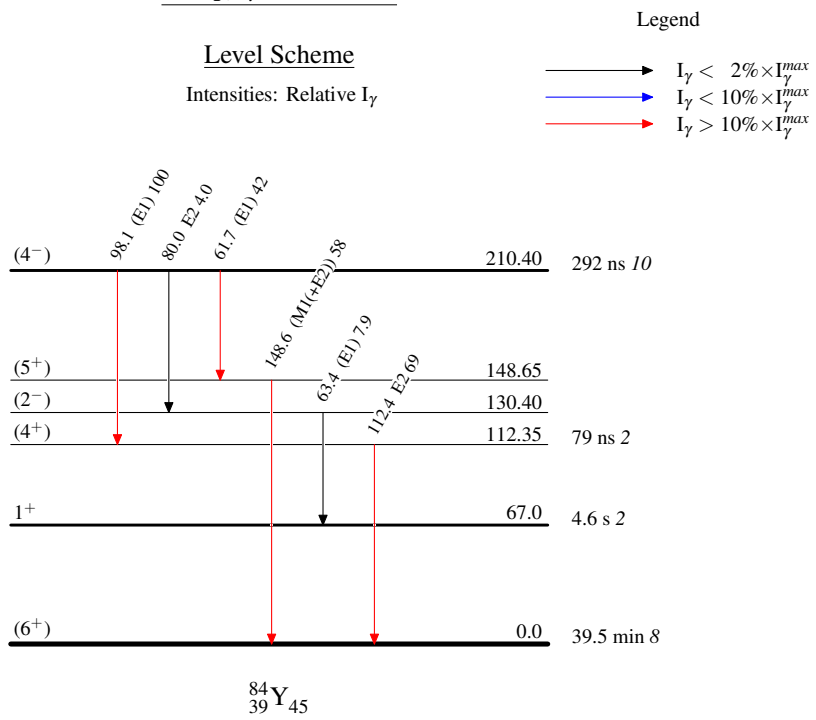
Level Scheme

Intensities: Relative I_γ



$^{84}_{39}Y_{45}$