

⁹⁰Zr(p,γ) **1971Ra08**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 114, 1293 (2013)	1-Sep-2013

E(p)=3.0 MeV to 7.2 MeV. 97% ⁹⁰Zr target. Ge(Li), FWHM=2.7 keV at 1.33 MeV.

⁹¹Nb Levels

All levels are fed by primary γ-rays, unless noted to the contrary.

E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]	E(level) [†]	J ^π [‡]
0	9/2 ⁺	2170 [#] 10	(≥7/2) [@]	3026.7 ^{&} 12	7/2,9/2,11/2 ⁽⁺⁾
104.62 5	1/2 ⁻	2275 [#] 10	(≥7/2) [@]	3067.7 15	(≤7/2) [@]
1186.5 3	5/2 ⁻	2290.2 10	(13/2) ⁺	3080 [#] 10	(≤7/2) [@]
1312.6 3	3/2 ⁻	2323.3 ^{&} 5	(5/2 ⁻)	3124.6 12	(≥7/2) [@]
1580.6 4	(7/2) ⁺	2329.8 6	(11/2) ⁺	3148.1 ^{&} 20	7/2,9/2,11/2
1612.4 4	3/2 ⁻	2344.8 5	(3/2) ⁻	3178.7 ^{&} 15	(3/2) ⁺
1636.4 4	(9/2 ⁺)	2389.7 4	(3/2 ⁺)	3185.3 12	7/2,9/2,11/2
1790.3 4	(9/2 ⁻)	2413.0 7	(11/2 ⁻)	3274.1 15	(≤7/2) [@]
1844.5 3	(5/2) ⁻	2530.4 6	(11/2 ⁻)	3300 [#] 10	(≥7/2) [@]
1885 [#] 8	(≥7/2) [@]	2579.0 5	(5/2 ⁺)	3370.1 15	5/2 ⁺ ,7/2 ⁺
1962.8 4	(5/2 ⁺)	2612.0 6	(7/2 ⁻)	3460 [#] 10	(≤7/2) [@]
1982.5 6	(13/2 ⁻)	2631.6 7	(9/2)	3562.1 15	(≤7/2) [@]
2065 [#] 8	(≥7/2) [@]	2791.2 8	(7/2 ⁺)	3670 [#] 10	(≤7/2) [@]
2120.4 5	(7/2 ⁻)	2880 [#] 8	(≤7/2) [@]	3780 [#] 10	(≤7/2) [@]

[†] From least-squares fit to E_γ for secondary γ-rays, unless indicated otherwise.

[‡] From Adopted Levels, except as noted.

[#] From unenumerated E_γ for primary transition (1971Ra08).

[@] From 1971Ra08, based on relative I_γ for primary γ feeding level and on bombarding energy dependence of I_γ.

[&] No primary γ observed.

γ(⁹¹Nb)

1971Ra08 report E_γ for secondary γ-transitions only.

E _γ	E _i (level)	J _i ^π	E _f	J _f ^π	E _γ	E _i (level)	J _i ^π	E _f	J _f ^π
(104.62 [‡] 5)	104.62	1/2 ⁻	0	9/2 ⁺	1790.0 4	1790.3	(9/2 ⁻)	0	9/2 ⁺
329.7 [†] 4	2120.4	(7/2 ⁻)	1790.3	(9/2 ⁻)	1962.8 4	1962.8	(5/2 ⁺)	0	9/2 ⁺
658.0 3	1844.5	(5/2) ⁻	1186.5	5/2 ⁻	1982.5 6	1982.5	(13/2 ⁻)	0	9/2 ⁺
1031.9 5	2344.8	(3/2) ⁻	1312.6	3/2 ⁻	2121.3 7	2120.4	(7/2 ⁻)	0	9/2 ⁺
1081.9 3	1186.5	5/2 ⁻	104.62	1/2 ⁻	^x 2228.9 8				
1136.8 [†] 4	2323.3	(5/2 ⁻)	1186.5	5/2 ⁻	2240.6 7	2344.8	(3/2) ⁻	104.62	1/2 ⁻
1207.9 3	1312.6	3/2 ⁻	104.62	1/2 ⁻	2285.0 4	2389.7	(3/2 ⁺)	104.62	1/2 ⁻
1266.4 4	2579.0	(5/2 ⁺)	1312.6	3/2 ⁻	2290.2 10	2290.2	(13/2) ⁺	0	9/2 ⁺
1507.8 4	1612.4	3/2 ⁻	104.62	1/2 ⁻	2329.8 6	2329.8	(11/2) ⁺	0	9/2 ⁺
1580.6 4	1580.6	(7/2) ⁺	0	9/2 ⁺	2413.0 7	2413.0	(11/2 ⁻)	0	9/2 ⁺
1636.4 4	1636.4	(9/2 ⁺)	0	9/2 ⁺	2530.4 6	2530.4	(11/2 ⁻)	0	9/2 ⁺
1739.9 4	1844.5	(5/2) ⁻	104.62	1/2 ⁻	2612.0 6	2612.0	(7/2 ⁻)	0	9/2 ⁺
^x 1778.1 [#] 5					2631.6 7	2631.6	(9/2)	0	9/2 ⁺

Continued on next page (footnotes at end of table)

${}^{90}\text{Zr}(\text{p},\gamma)$ **1971Ra08 (continued)** $\gamma({}^{91}\text{Nb})$ (continued)

E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π
2791.2 8	2791.2	(7/2 ⁺)	0	9/2 ⁺	3148.0 [†] 15	3148.1	7/2,9/2,11/2	0	9/2 ⁺
2963.0 15	3067.7	(\leq 7/2)	104.62	1/2 ⁻	3185.2 12	3185.3	7/2,9/2,11/2	0	9/2 ⁺
3026.6 [†] 12	3026.7	7/2,9/2,11/2 ⁽⁺⁾	0	9/2 ⁺	3274.0 [†] 15	3274.1	(\leq 7/2)	0	9/2 ⁺
3074.0 [†] 15	3178.7	(3/2) ⁺	104.62	1/2 ⁻	3370.0 ^{@&} 15	3370.1	5/2 ⁺ ,7/2 ⁺	0	9/2 ⁺
3124.5 [†] 12	3124.6	(\geq 7/2)	0	9/2 ⁺	3562.0 [†] 15	3562.1	(\leq 7/2)	0	9/2 ⁺

[†] Not placed by **1971Ra08** but placement is known from other sources (see Adopted Levels, Gammas).

[‡] Not observed in this experiment. E_γ from Adopted Gammas.

Consistent with that expected for transition from $E=1885$ 8 level to 1/2⁻ 105 level, but tentative $J \geq 7/2$ for 1885 level is inconsistent with such a placement.

@ Tentatively placed by evaluator from 3365 10 level based on E_γ .

& Placement of transition in the level scheme is uncertain.

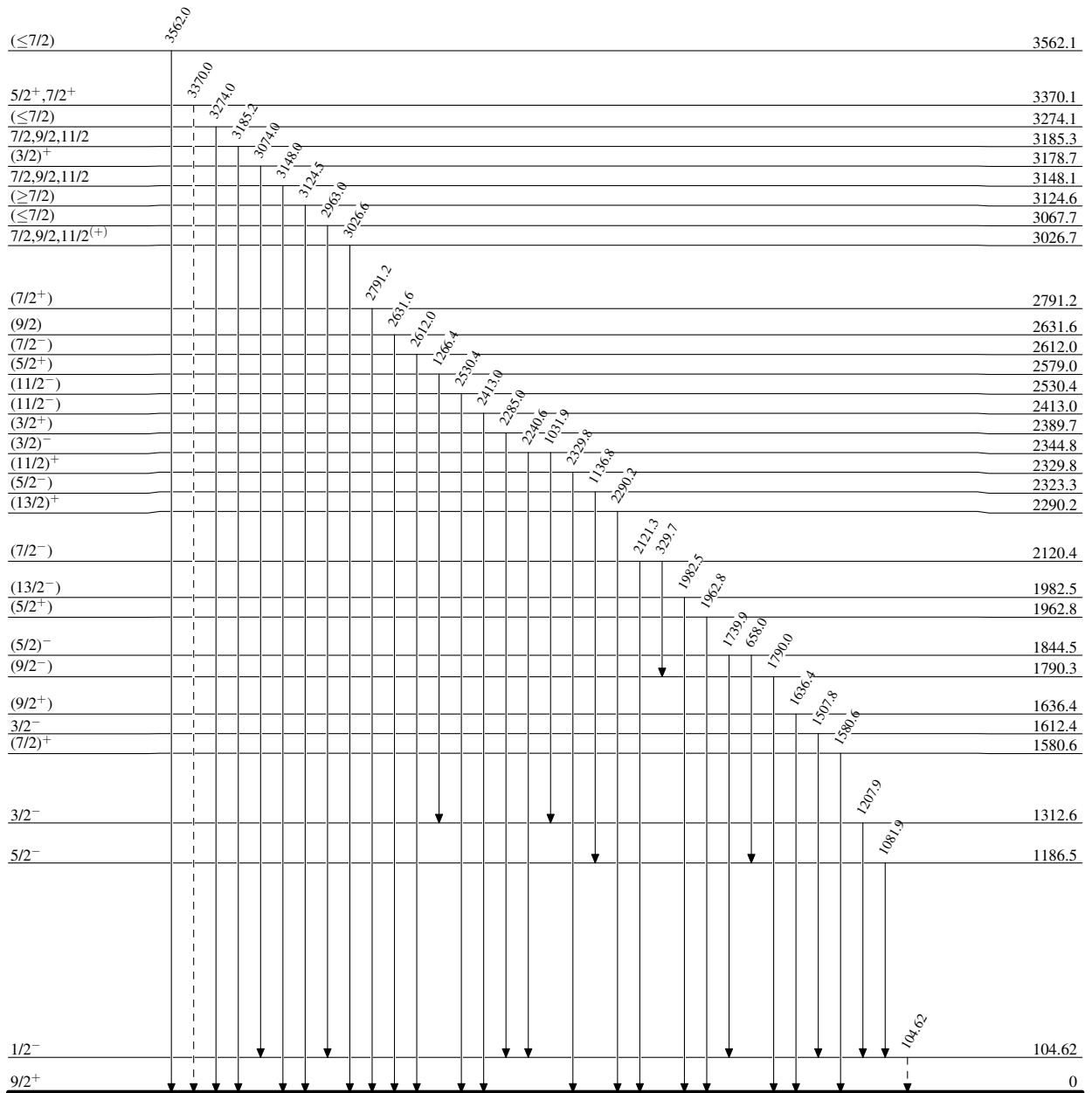
^x γ ray not placed in level scheme.

$^{90}\text{Zr}(p,\gamma)$ 1971Ra08

Legend

Level Scheme

-----► γ Decay (Uncertain)



$^{91}_{41}\text{Nb}_{50}$