$^{83}_{40}$Zr

Δ: –66460 *100* **S_n:** 10300 *500* **S_p:** 5560 *140*
Q_{EC}: 5870 *90*

Nuclear Bands

A 1/2[301]
B 5/2[422], α=+1/2
C 5/2[422], α=-1/2
D 5/2[303], α=+1/2
E 5/2[303], α=-1/2
F 3/2[301]
G α=-1/2
H α=+1/2
I SD-1 band (96Ru16)
J SD-2 band (96Ru16)

Levels and γ-ray branchings:

A **0**, (1/2⁻), 44 *1* s, %EC+%β⁺=100, %ECp=?

D **52.72** *5*, (5/2⁻), 0.53 *12* μs γ_{0}***52.70*** *5* (†$_{\gamma}$100) E2

C **77.04** *7*, (7/2⁺), 132 *55* ns γ_{53}***24.30*** *5* (†$_{\gamma}$100) E1

A **129.1** *1*, (3/2⁻) γ_{0}***129.5*** *1* (†$_{\gamma}$100) M1+E2: δ=0.17 *7*

B **138.8** *1*, (9/2⁺) γ_{77}***61.7*** *1* (†$_{\gamma}$100) M1+E2: δ=0.05

F **328.5** *2*, (3/2⁻) γ_{129}***199.4*** *3* (†$_{\gamma}$<100) γ_{0}***328.4*** *2* (†$_{\gamma}$100 *10*)

E **338.5** *1*, (7/2⁻), 50 *4* ps γ_{129}***209.4*** *2* (†$_{\gamma}$<6) γ_{77}***261.3*** *1* (†$_{\gamma}$15.8 *11*) E1 γ_{53}***285.8*** *1* (†$_{\gamma}$100 *8*) M1+E2: δ= –0.51

A **372.6** *1*, (5/2⁻) γ_{129}***243.1*** *1* (†$_{\gamma}$100 *8*) γ_{0}***372.8*** *2* (†$_{\gamma}$74 *5*)
580.0 *3* γ_{0}***580.0*** *3* (†$_{\gamma}$100)

A **582.7** *1*, (7/2⁻) γ_{373}***210.1*** *1* (†$_{\gamma}$26 *3*) γ_{129}***453.3*** *2* (†$_{\gamma}$100 *7*) E2

F **623.9** *3*, (5/2⁻) γ_{329}***295.4*** *3* γ_{129}***492.5*** *5*

D **680.3** *2*, (9/2⁻), 4.2 *8* ps γ_{339}***341.7*** *2* (†$_{\gamma}$13.9 *11*) M1+E2: δ<0.3 γ_{53}***627.6*** *3* (†$_{\gamma}$100 *7*) E2

C **769.0** *3*, (11/2⁺), 2.0 *3* ps γ_{139}***630.0*** *4* (†$_{\gamma}$100 *7*) M1+E2: δ=0.11 γ_{77}***692.3*** *5* (†$_{\gamma}$29.3 *21*)

B **880.3** *3*, (13/2⁺), 2.3 *3* ps γ_{769}***111.3*** *2* (†$_{\gamma}$<2) M1+E2: δ=0.04 γ_{139}***741.6*** *4* (†$_{\gamma}$100 *5*) E2

A **983.2** *2*, (9/2⁻) γ_{583}***400.6*** *3* (†$_{\gamma}$32.1 *25*) γ_{373}***610.5*** *3* (†$_{\gamma}$100 *7*) E2

E **1013.4** *2*, (11/2⁻), 1.9 *3* ps γ_{680}***333.2*** *2* (†$_{\gamma}$<6) γ_{583}***430.9*** *2* (†$_{\gamma}$8.0 *6*) γ_{339}***674.7*** *3* (†$_{\gamma}$100 *9*) E2

A **1262.2** *3*, (11/2⁻), 1.7 *4* ps γ_{983}***279.0*** *3* (†$_{\gamma}$<16) γ_{583}***679.4*** *4* (†$_{\gamma}$100 *8*)
1345.8 *4*, (11/2⁺) γ_{880}***465.5*** *3* (†$_{\gamma}$100) (M1+E2): δ<0.3
1384.2 *6* γ_{580}***804.2*** *5* (†$_{\gamma}$100)

D **1475.8** *3*, (13/2⁻), 0.76 *21* ps γ_{1013}***462.6*** *4* (†$_{\gamma}$<8) γ_{680}***795.3*** *4* (†$_{\gamma}$100 *11*) E2
1591.3 *4* γ_{580}***1011.3*** *3* (†$_{\gamma}$100)

C **1662.9** *4*, (15/2⁺) γ_{880}***782.4*** *4* (†$_{\gamma}$99 *8*) M1+E2: δ<0.3 γ_{769}***893.9*** *5* (†$_{\gamma}$100 *12*)
1733.7 *6* γ_{1384}***349.5*** *2* (†$_{\gamma}$100)

A **1771.4** *4*, (13/2⁻) γ_{1262}***509.1*** *4* (†$_{\gamma}$<44) γ_{983}***788.4*** *5* (†$_{\gamma}$100 *9*)

B **1817.4** *4*, (17/2⁺), 0.42 *14* ps γ_{1663}***154.5*** *3* (†$_{\gamma}$<2.8) γ_{880}***937.2*** *5* (†$_{\gamma}$100 *7*) E2

E **1830.0** *4*, (15/2⁻), 0.62 *21* ps γ_{1013}***816.6*** *4* (†$_{\gamma}$100) E2
2021.3 *8* γ_{1384}***637.1*** *5* (†$_{\gamma}$100)

A **2126.2** *6*, (15/2⁻) γ_{1262}***864.0*** *5* (†$_{\gamma}$100) E2
2159.7 *7* γ_{1734}***426.0*** *3* (†$_{\gamma}$100)
2258.3 *8* γ_{1013}***1244.9*** *8* (†$_{\gamma}$100)
2359.6 *8* γ_{1591}***768.3*** *6* (†$_{\gamma}$100)

D **2398.3** *5*, (17/2⁻), 0.83 *21* ps γ_{1476}***922.3*** *5* (†$_{\gamma}$100) E2
2494.6 *7*, (19/2⁻) γ_{1830}***664.6*** *5* (†$_{\gamma}$100)

A **2674.9** *7*, (17/2⁻) γ_{1771}***903.5*** *6* (†$_{\gamma}$100)

C **2708.4** *5*, (19/2⁺) γ_{1817}***890.5*** *6* (†$_{\gamma}$79 *13*) γ_{1663}***1045.2*** *6* (†$_{\gamma}$100 *15*)

E **2743.1** *6*, (19/2⁻), 0.83 *21* ps γ_{1830}***913.2*** *5* (†$_{\gamma}$100) E2

B **2913.0** *6*, (21/2⁺), 0.37 *6* ps γ_{2708}***204.5*** *2* (†$_{\gamma}$<3.4) γ_{1817}***1096.4*** *6* (†$_{\gamma}$100 *10*) E2
2926 *1* γ_{1734}***1192.4*** *10* (†$_{\gamma}$100)

A **3095.5** *9*, (19/2⁻) γ_{2126}***969.3*** *6* (†$_{\gamma}$100)

G **3138** *1*, (19/2⁻) γ_{2743}***395*** γ_{1830}***1307***
3304.9 *6*, (21/2⁺) γ_{2913}***391.8*** *2* γ_{2708}***597***

D **3374.2** *6*, (21/2⁻) γ_{2398}***975.7*** *6* (†$_{\gamma}$100) (E2)
3587.0 *6* γ_{2743}***844.1*** *7* (†$_{\gamma}$100)

H **3625.3** *6*, (21/2⁻) γ_{2398}***1227.2*** *7* (†$_{\gamma}$100)

A **3689** *1*, (21/2⁻) γ_{2675}***1014.0*** *7* (†$_{\gamma}$100)

C **3726.1** *6*, (23/2⁺) γ_{3305}***421.0*** *3* (†$_{\gamma}$77 *7*) (M1+E2): δ<0.3 γ_{2913}***813.5*** *5* (†$_{\gamma}$83 *7*) γ_{2708}***1018.8*** *7* (†$_{\gamma}$100 *13*)

E **3730.9** *7*, (23/2⁻) γ_{2743}***987.9*** *5* (†$_{\gamma}$100)

B **3955.3** *7*, (25/2⁺), 0.40 *6* ps γ_{3726}***230.4*** *2* (†$_{\gamma}$6.0 *5*) M1+E2: δ<0.3 γ_{2913}***1042.1*** *5* (†$_{\gamma}$100 *10*) E2

G **3981.7** *6*, (23/2⁻) γ_{3625}***356.4*** *3* (†$_{\gamma}$<86) γ_{3587}***394.7*** *3* (†$_{\gamma}$<86) γ_{3374}***607.5*** *5* (†$_{\gamma}$100 *13*) γ_{3138}***844*** γ_{2743}***1239***
4092.0 *8*, (23/2⁺) γ_{3955}***136.9*** *2* γ_{3726}***365.2*** *3* M1+E2: δ<0.3

A **4188** *1*, (23/2⁻) γ_{3096}***1092.3*** *7* (†$_{\gamma}$100)

4283.0 *9*, (25/2$^+$) γ_{3955}***331***(?)
γ_{2913}***1370.0*** *7* (†$_\gamma$100) (E2)

D **4431.4** *8*, (25/2$^-$) γ_{3374}***1056.9*** *6* (†$_\gamma$100)

H **4469.7** *7*, (25/2$^-$) γ_{3982}***488.2*** *5* (†$_\gamma$<80)
γ_{3731}***738.6*** *5* (†$_\gamma$100 *8*)

C **4767** *1*, (27/2$^+$) γ_{3726}***1041***

E **4839.1** *8*, (27/2$^-$) γ_{3731}***1108.4*** *6* (†$_\gamma$100)

B **4904.3** *9*, (29/2$^+$), 0.35 *7* ps γ_{3955}***949.0*** *5*
(†$_\gamma$100) E2

G **4943.7** *8*, (27/2$^-$) γ_{4431}***512.2*** *5* (†$_\gamma$100 *9*)
γ_{3982}***961.5*** *9* (†$_\gamma$71 *9*)

A **5348** *2*, (27/2$^-$) γ_{4188}***1160.2*** *8* (†$_\gamma$100)

H **5460.4** *8*, (29/2$^-$) γ_{4944}***516.2*** *6* (†$_\gamma$<100)
γ_{4839}***621.5*** *5* (†$_\gamma$100 *10*) γ_{4470}***991.4*** *11*
(†$_\gamma$<100)

5626 *2*(?) γ_{4283}***1343***(?)

D **5645** *1*, (29/2$^-$) γ_{4431}***1213.9*** *7* (†$_\gamma$100)
E2

C **5934** *1*, (31/2$^+$) γ_{4767}***1167***

G **6022** *1*, (31/2$^-$) γ_{5645}***376*** γ_{4944}***1079***

B **6028** *1*, (33/2$^+$) γ_{4904}***1123.8*** *6* (†$_\gamma$100)
E2

E **6074** *1*, (31/2$^-$) γ_{4839}***1234.6*** *7* (†$_\gamma$100)
E2

H **6570** *2*, (33/2$^-$) γ_{6022}***548***(?) γ_{5460}***1111***

D **6949** *1*, (33/2$^-$) γ_{5645}***1304***

C **7195** *2*, (35/2$^+$) γ_{5934}***1261***

G **7235** *2*, (35/2$^-$) γ_{6022}***1213***

B **7325** *1*, (37/2$^+$) γ_{6028}***1297.2*** *7* (†$_\gamma$100)
E2

E **7380** *1*, (35/2$^-$) γ_{6074}***1306.7*** *7* (†$_\gamma$100)
E2

7628 *2*, (37/2$^+$) γ_{6028}***1600***

H **7817** *2*, (37/2$^-$) γ_{6570}***1247***

D **8275** *2*, (37/2$^-$) γ_{6949}***1326***

C **8586** *2*, (39/2$^+$) γ_{7195}***1391***

G **8611** *2*, (39/2$^-$) γ_{7235}***1376***

E **8758** *2*, (39/2$^-$) γ_{7380}***1377.5*** *8* (†$_\gamma$100)

B **8812** *2*, (41/2$^+$) γ_{7325}***1486.8*** *8* (†$_\gamma$100)
E2

H **9229** *2*, (41/2$^-$) γ_{7817}***1412***

D **9689** *2*, (41/2$^-$) γ_{8275}***1414***

G **10137** *2*, (43/2$^-$) γ_{8611}***1526***

C **10224** *2*, (43/2$^+$) γ_{8586}***1638***

E **10310** *2*, (43/2$^-$) γ_{8758}***1552***

B **10516** *2*, (45/2$^+$) γ_{8812}***1704***

H **10810** *2*, (45/2$^-$) γ_{9229}***1581***

G **11786** *2*, (47/2$^-$) γ_{10137}***1649***

E **12080** *2*(?), (47/2$^-$) γ_{10310}***1770***(?)

C **12087** *2*, (47/2$^+$) γ_{10224}***1863***

B **12433** *3*, (49/2$^+$) γ_{10516}***1917***

H **12582** *3*(?), (49/2$^-$) γ_{10810}***1772***(?)

B **14510** *3*, (53/2$^+$) γ_{12433}***2077***

B **16736** *3*, (57/2$^+$) γ_{14510}***2226***

B **19217** *3*(?), (61/2$^+$) γ_{16736}***2481***(?)

0+x

581+x γ_{0+x}***581***

1385+x γ_{581+x}***804***

2397+x(?) γ_{1385+x}***1012***

3589+x(?) γ_{2397+x}***1192***

3939+x γ_{3589+x}***350***

4365+x γ_{3939+x}***426***

I **y**, J≈(31/2)

I **1378+y**, J+2 γ_y***1378*** (†$_\gamma$0.35 *5*)
$I^{(2)}$*=22.7, ħω=0.733*

I **1563+y**, J+2

I **2912+y**, J+4 γ_{1378+y}***1534*** (†$_\gamma$0.80 *10*)

I **2996+y**, J+4 γ_{1563+y}***1433***

I **4550+y**, J+6 γ_{2996+y}***1554*** $I^{(2)}$*=20.5,*
ħω=0.826 γ_{2912+y}***1638*** (†$_\gamma$1.05 *10*)

I **6299+y**, J+8 γ_{4550+y}***1749*** (†$_\gamma$1.00 *10*)
(Q) $I^{(2)}$*=25.2, ħω=0.914*

I **8207+y**, J+10 γ_{6299+y}***1908*** (†$_\gamma$1.00 *10*)
(Q) $I^{(2)}$*=24.2, ħω=0.995*

I **10280+y**, J+12 γ_{8207+y}***2073*** (†$_\gamma$1.00 *10*)
(Q) $I^{(2)}$*=23.8, ħω=1.078*

I **12521+y**, J+14 $\gamma_{10280+y}$***2241*** (†$_\gamma$0.85 *10*)
(Q) $I^{(2)}$*=23.5, ħω=1.163*

I **14932+y**, J+16 $\gamma_{12521+y}$***2411*** (†$_\gamma$0.45 *10*)
$I^{(2)}$*=23.0, ħω=1.249*

I **17517+y**, J+18 $\gamma_{14932+y}$***2585*** (†$_\gamma$0.30 *5*)
$I^{(2)}$*=22.7, ħω=1.336*

I **20278+y**, J+20 $\gamma_{17517+y}$***2761*** (†$_\gamma$0.18 *5*)
$I^{(2)}$*=22.6, ħω=1.425*

I **23216+y**(?), J+22 $\gamma_{20278+y}$***2938***(?)
(†$_\gamma$0.09 *3*)

J **z**, J≈(33/2)

J **1448+z**, J+2 γ_z***1448*** (†$_\gamma$0.20 *5*)
$I^{(2)}$*=23.0, ħω=0.768*

J **3070+z**, J+4 γ_{1448+z}***1622*** (†$_\gamma$0.25 *5*)
$I^{(2)}$*=23.4, ħω=0.854*

J **4863+z**, J+6 γ_{3070+z}***1793*** (†$_\gamma$0.30 *5*)
$I^{(2)}$*=23.7, ħω=0.939*

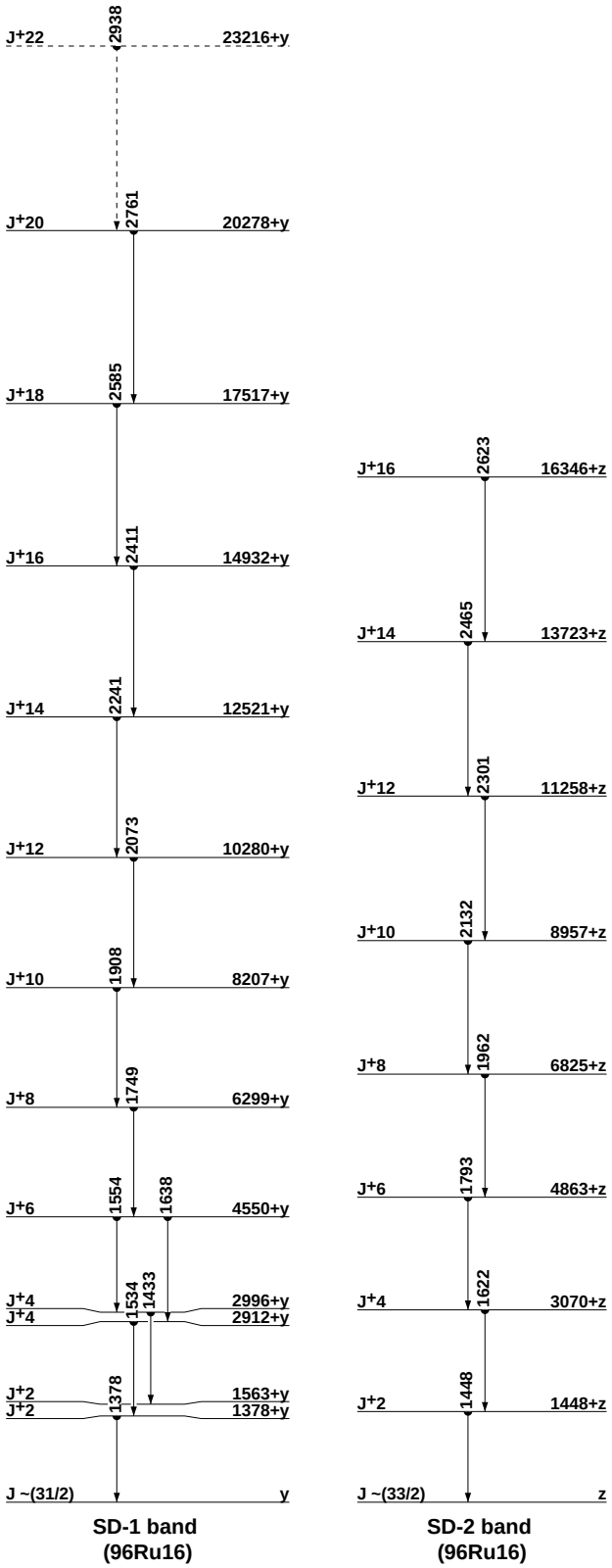
J **6825+z**, J+8 γ_{4863+z}***1962*** (†$_\gamma$0.18 *5*)
$I^{(2)}$*=23.5, ħω=1.023*

J **8957+z**, J+10 γ_{6825+z}***2132*** (†$_\gamma$0.20 *5*)
$I^{(2)}$*=23.7, ħω=1.108*

J **11258+z**, J+12 γ_{8957+z}***2301*** (†$_\gamma$0.18 *5*)
$I^{(2)}$*=24.4, ħω=1.192*

J **13723+z**, J+14 $\gamma_{11258+z}$***2465*** (†$_\gamma$0.13 *5*)
$I^{(2)}$*=25.3, ħω=1.272*

J **16346+z**, J+16 $\gamma_{13723+z}$***2623*** (†$_\gamma$0.08 *3*)



SD-1 band
(96Ru16)

SD-2 band
(96Ru16)

$^{83}_{40}$Zr