	⁵⁰ Cr(¹⁶ Ο,2pn γ)	1998Si04	
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		History		
Туре	Author	Citation		Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 196,17	7 (2024)	30-Sep-2023

63Zn Levels

1998Si04: E=75 MeV ¹⁶O beam was produced from the 15-UD Pelletron Accelerator of Nuclear Science Center, New Delhi. Target was an about 20 mg/cm² thick 92% enriched ⁵⁰Cr on a gold backing. γ rays were detected with an array of 12 Compton suppressed HPGe detectors along with 14 BGO detectors to reduce radioactive background. Measured E γ , I γ , $\gamma\gamma$ -coin, $\gamma\gamma(\theta)$ (DCO). Deduced levels, J, π , band assignments, γ -ray multipolarities. Comparisons with theoretical calculations.

E(level) [†]	J#‡	E(level) [†]	J ^{π‡}	E(level) [†]	$J^{\pi \ddagger}$	E(level) [†]	J ^{π‡}
0 ^{&}	3/2-	2051 ^{&}	9/2-	3772 [@]	$(15/2)^+$	6490 [@]	$(23/2)^+$
193 &	5/2-	2320 ^{&}	$11/2^{-}$	4357 <mark>&</mark>	$(15/2^{-})$	6572 ^{&}	$23/2^{(-)}$
637	$3/2^{-}$	2587 [#]	$13/2^{+}$	5079 [@]	$(19/2)^+$	7613 <mark>&</mark>	$25/2^{-}$
650	$5/2^{-}$	2828 [@]	$(11/2)^+$	5348 [#]	$21/2^+$	7929 <mark>&</mark>	$27/2^{(-)}$
1064 <mark>&</mark>	$7/2^{-}$	2935	$13/2^{-}$	5408 <mark>&</mark>	$17/2^{-}$	9099 <mark>&</mark>	$(29/2)^{-}$
1207	$7/2^{-}$	3482	$13/2^{+}$	5426	$17/2^{-}$	9776 <mark>&</mark>	$(31/2^{-})$
1437	9/2-	3529 <mark>&</mark>	$13/2^{-}$	5918 <mark>&</mark>	19/2-		
1704 [#]	$9/2^{+}$	3766 [#]	$17/2^{+}$	6236 <mark>&</mark>	$21/2^{-}$		

[†] As given in 1998Si04, based on $E\gamma$ data.

[‡] As given in 1998Si04, based on known assignments of low-lying levels, measured DCO ratios, band assignments. When considered in Adopted Levels, the firm assignments for high-spin states from this dataset will be placed in parentheses if there are no strong supporting arguments.

[#] Band(A): Band based on 1704, $9/2^+$ level. Proposed configuration= $\nu g 9/2$ coupled to quadrupole phonon of even-even core.

[@] Band(B): Band based on 2828, $(11/2)^+$ level.

& Seq.(C): Sequence based on g.s., $3/2^-$.

E_{γ}^{\dagger}	I_{γ}^{\dagger}	E _i (level)	\mathbf{J}_i^{π}	E_f	\mathbf{J}_{f}^{π}	Mult. [‡]	Comments
193	100	193	5/2-	0	3/2-	(D)	DCO=1.4 1
267	4.3 2	1704	$9/2^{+}$	1437	9/2-		
318	10.5 5	6236	$21/2^{-}$	5918	19/2-	(D)	DCO=1.4 3
336	11.0 6	6572	$23/2^{(-)}$	6236	$21/2^{-}$	D	DCO=2.0 4
414	72 4	1064	$7/2^{-}$	650	$5/2^{-}$	D	DCO=2.3 2
457	8.6 4	650	$5/2^{-}$	193	5/2-		
492	5.0 <i>3</i>	5918	19/2-	5426	$17/2^{-}$		
497	31.6 16	1704	9/2+	1207	$7/2^{-}$	D	DCO=2.0 2
510	4.1 5	5918	19/2-	5408	$17/2^{-}$		
569	7.5 6	1207	$7/2^{-}$	637	$3/2^{-}$		
591	20.4 10	4357	$(15/2^{-})$	3766	$17/2^{+}$	(D)	DCO=1.3 6
637	6.6 4	637	$3/2^{-}$	0	$3/2^{-}$		
640	184 9	1704	9/2+	1064	$7/2^{-}$	D	DCO=1.8 1
650	49.7 25	650	$5/2^{-}$	0	$3/2^{-}$	D	DCO>2
654		3482	$13/2^{+}$	2828	$(11/2)^+$		
654	11.4 7	6572	$23/2^{(-)}$	5918	$19/2^{-}$	Q	DCO=1.1 2
810	19.5 10	6236	$21/2^{-}$	5426	$17/2^{-}$	Q	DCO=0.7 2
828	27.9 15	6236	$21/2^{-}$	5408	$17/2^{-}$	Q	DCO=1.0 2
871	33.0 17	1064	7/2-	193	5/2-	(D)	DCO=1.2 1
875	2.7 3	4357	$(15/2^{-})$	3482	$13/2^{+}$		

 $\gamma(^{63}\text{Zn})$

Continued on next page (footnotes at end of table)

50 Cr(16 O,2pn γ) 1998Si04 (continued)

$\gamma(^{63}$ Zn) (continued)

E_{γ}^{\dagger}	I_{γ}^{\dagger}	E _i (level)	\mathbf{J}_i^{π}	E_f	\mathbf{J}_f^{π}	Mult. [‡]	Comments
883 888	223 11	2587 6236	$\frac{13/2^+}{21/2^-}$	1704 9 5348 2	$\frac{1}{2^{+}}$	Q	DCO=0.9 1
944	14.3 9	3772	$(15/2)^+$	2828 (1	$11/2)^+$		DCO=1.4 4 Based on example γ with similar DCO values in 1998Si04, this γ should have Mult=(D) with Δ J=(1), but Δ J=(2) is from the level scheme
987	38.8 19	2051	9/2-	1064 7	$1/2^{-1}$	D	DCO=2.1 5
1013	36.6 19	1207	$7/2^{-}$	193 5	$/2^{-}$	(D)	DCO=1.2 2
1064	129 7	1064	7/2-	0 3	/2-	Q	DCO=1.0 <i>1</i>
1124	9.1 6	2828	(11/2)+	1704 9,	/2+		DCO=0.8 2 Based on example γ with similar DCO values in 1998Si04, this γ should have Mult=Q with Δ J=2, but Δ J=1 is from the level scheme.
1157	35.9 19	6236	$21/2^{-}$	5079 (1	19/2)+	(D)	DCO=1.4 3
1179	160 8	3766	$17/2^{+}$	2587 1	3/2+	Q	DCO=1.1 1
1185	18.2 9	3772	$(15/2)^+$	2587 1	3/2+		DCO=0.9 1
							Based on example γ with similar DCO values in 1998Si04, this γ should have Mult=Q with Δ J=2, but Δ J=1 is from the level scheme.
1207	29.6 16	1207	$7/2^{-}$	0 3	/2-	Q	DCO=1.0 2
1209	17.4 10	3529	$13/2^{-}$	2320 1	$1/2^{-}$	D	DCO=1.9 4
1224	109 6	6572	$23/2^{(-)}$	5348 2	$1/2^{+}$	D	DCO=2.1 2
1244	30.1 16	1437	9/2-	193 5	/2-		
1256	20.1 11	2320	$11/2^{-}$	1064 7	/2-	Q	DCO=0.8 2
1307	25.5 13	5079	$(19/2)^+$	3772 (1	15/2)'	Q	DCO=0.9 2
1313	59 5	5079	(19/2)	3700 1	1/2		Based on example γ with similar DCO values in 1998Si04, this γ should have Mult=Q with Δ J=2, but Δ J=1 is from the level scheme.
1357	33.8 18	7929	$27/2^{(-)}$	6572 2	$3/2^{(-)}$	(Q)	DCO=1.3 1
1377	29.3 15	7613	$25/2^{-}$	6236 2	$1/2^{-}$	Q	DCO=0.7 2
1411	15.5 <i>11</i>	6490	$(23/2)^+$	5079 (1	19/2)+	Q	DCO=0.8 3
1478	12.7 7	3529	$13/2^{-}$	2051 9	/2-	Q	DCO=1.0 2
1486	16.0 9	9099	$(29/2)^{-}$	7613 2	5/2-	(Q)	DCO=1.2 3
1498	20.7 11	2935	13/2-	1437 9,	/2-		DCO=1.6 5 Based on example γ with similar DCO values in 1998Si04, this γ should have Mult=D with Δ J=1, but Δ J=2 is from the level scheme.
1510	4.4 5	1704	$9/2^{+}$	193 5	$/2^{-}$		
1561	8.7 5	5918	19/2-	4357 (1	15/2 ⁻)		
1582	93 <i>5</i>	5348	$21/2^{+}$	3766 1	7/2+	(Q)	DCO=1.2 1
1659	15.0 9	5426	$17/2^{-}$	3766 1	7/2+		DCO>2
1770	18 0 10	1257	$(15/2^{-})$	2507 1	2/2+	(D)	$\Delta J=0$ in 1998Si04.
1778	10.0 10 5 2 1	4337 3487	(13/2) $13/2^+$	238/ 1	3/2 12+	(D)	DCU=1.2 3
18/17	5.24 63.6	0776	$(31/2^{-})$	7020 2	$7^{-1/2}(-)$		
1858	162	2051	$9/2^{-}$	1929 2	12-		
1879	11.2.7	5408	$17/2^{-1}$	3529 1	$\frac{3}{2}$	0	DCO=1.1 2
1897	19.3 11	5426	$17/2^{-}$	3529 1	$3/2^{-}$	ò	DCO=1.0 2
2472	3.1 7	5408	17/2-	2935 1	3/2-		
2490	2.0 7	5426	$17/2^{-}$	2935 1	3/2-		

[†] From 1998Si04. No uncertainty in $E\gamma$ is given by the authors. [‡] Deduced by the evaluator from measured DCO ratios with a gate on a $\Delta J=2$ transition in 1998Si04. Even though expected values

⁵⁰Cr(¹⁶O,2pnγ) **1998Si04** (continued)

$\gamma(^{63}$ Zn) (continued)

of DCO ratios for stretched dipole and quadrupole transitions are not explicitly specified in 1998Si04, it can be implied from several examples of DCO ratios and corresponding multipolarities mentioned in 1998Si04 that, DCO \approx 2.0 is for a stretched dipole (Δ J=1) transition and DCO \approx 1.0 for a stretched quadrupole (Δ J=2) transition.



 $^{63}_{30}$ Zn $_{33}$



⁶³₃₀Zn₃₃

⁵⁰Cr(¹⁶O,2pnγ) 1998Si04



 $^{63}_{30}$ Zn₃₃