

⁴⁰Ca(²⁹Si,4pγ) 2000Yu02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 202,59 (2025)	25-Feb-2025

Adapted from the XUNDL dataset for 2000Yu02 compiled by C.T. Malcolmson and B. Singh (McMaster University), on 20 July, 2000.

[Additional information 1.](#)

2000Yu02: E=130 MeV ²⁹Si beam was produced from the 88-inch Cyclotron at LBNL. Target was a layer of 0.5 mg/cm² enriched ⁴⁰Ca on a 2.5 mg/cm² Ta backing. γ rays were detected with the Gammasphere of 100 detectors and charged particles were detected with the MICROBALL array consisting of 95-element CsI detectors. Measured E_γ, γγ-coin, Doppler-shifted line-shape. Deduced levels, J, π, band structures, quadrupole moments. See also 1999YuZY, 1998YuZY.

Level scheme for the normal-deformed states has been taken (by 2000Yu02) from 1978En02.

⁶⁵Zn Levels

E(level) [†]	J ^π [‡]	Comments
0	5/2 ⁻	
115	3/2 ⁻	
864	7/2 ⁻	
1066	9/2 ⁺	
2053	13/2 ⁺	
2139	11/2 ⁺	
2924	13/2 ⁽⁺⁾	
3226	17/2 ⁺	
3784	17/2 ⁽⁺⁾	
4079	(17/2 ⁺)	
4934	(21/2 ⁺)	
5065	(21/2 ⁺)	J ^π : (19/2) in 2000Yu02.
5411	(23/2 ⁺)	J ^π : (21/2) in 2000Yu02.
5769	(25/2 ⁺)	
6842	(29/2 ⁺)	
x [@]	J _≥ (25/2) [#]	Additional information 2.
1341+x [@]	J+2	
2832+x [@]	J+4	
4500+x [@]	J+6	
6387+x [@]	J+8	
8508+x [@]	J+10	
10870+x [@]	J+12	
13533+x [@]	J+14	
16538+x [@]	J+16	
19887+x [@]	J+18	
y	J1	Additional information 3.
744+y ^{&}	J1+1	
1621+y ^{&}	J1+2	
2478+y ^{&}	J1+3	
3396+y ^{&}	J1+4	
4338+y ^{&}	J1+5	
5357+y ^{&}	J1+6	
6402+y ^{&}	J1+7	
7610+y ^{&}	J1+8	
8841+y ^{&}	J1+9	

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$^{40}\text{Ca}(^{29}\text{Si},4p\gamma)$ **2000Yu02 (continued)**

^{65}Zn Levels (continued)

E(level) [†]	J ^π [‡]	Comments
10307+y&	J1+10	
11658+y&	J1+11	
13295+y&	J1+12	
z ^a	J2	Additional information 4.
688+z ^a	J2+1	
1454+z ^a	J2+2	
2304+z ^a	J2+3	
3250+z ^a	J2+4	
4238+z ^a	J2+5	
5353+z ^a	J2+6	
6553+z ^a	J2+7	
7906+z ^a	J2+8	
9379+z ^a	J2+9	
11029+z? ^a	J2+10	

[†] From E_γ data.

[‡] From Adopted Levels for normal deformed levels.

J_z ≥ 25/2, from coincidence observation of γ rays in the SD band with γ rays from the 6842-keV level from normal deformed band.

@ Band(A): SD band (2000Yu02). Q(transition)=2.6 3. Configuration=(n,g9/2)³(p,g9/2)², α=+1/2. Population intensity ≈2.5% of the 202γ from normal deformed state.

& Band(B): Highly-deformed band 1. Q(transition)=2.1 3. Configuration=(n,g9/2)²(p,g9/2)². Population intensity ≈50% of SD band.

^a Band(C): Highly-deformed band 2. Configuration=(n,g9/2)³(p,g9/2)(p,f7/2). Population intensity ≈0.7% of 202γ from normal deformed state.

γ(^{65}Zn)

E _γ [†]	I _γ [‡]	E _i (level)	J _i ^π	E _f	J _f ^π
115		115	3/2 ⁻	0	5/2 ⁻
202	100	1066	9/2 ⁺	864	7/2 ⁻
346		5411	(23/2 ⁺)	5065	(21/2 ⁺)
688		688+z	J2+1	z	J2
704		5769	(25/2 ⁺)	5065	(21/2 ⁺)
749		864	7/2 ⁻	115	3/2 ⁻
766		1454+z	J2+2	688+z	J2+1
785		2924	13/2 ⁽⁺⁾	2139	11/2 ⁺
835		5769	(25/2 ⁺)	4934	(21/2 ⁺)
850		2304+z	J2+3	1454+z	J2+2
864		864	7/2 ⁻	0	5/2 ⁻
918		3396+y	J1+4	2478+y	J1+3
942		4338+y	J1+5	3396+y	J1+4
945		3250+z	J2+4	2304+z	J2+3
987		2053	13/2 ⁺	1066	9/2 ⁺
988		4238+z	J2+5	3250+z	J2+4
1020		5357+y	J1+6	4338+y	J1+5
1046		6402+y	J1+7	5357+y	J1+6
1073 [#]		2139	11/2 ⁺	1066	9/2 ⁺
1073 [#]		6842	(29/2 ⁺)	5769	(25/2 ⁺)
1114		5353+z	J2+6	4238+z	J2+5
1155		4079	(17/2 ⁺)	2924	13/2 ⁽⁺⁾
1173		3226	17/2 ⁺	2053	13/2 ⁺

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⁴⁰Ca(²⁹Si,4pγ) 2000Yu02 (continued)

γ(⁶⁵Zn) (continued)

<u>E_γ[†]</u>	<u>I_γ[‡]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>
1201@		6553+z	J2+7	5353+z	J2+6
1208		7610+y	J1+8	6402+y	J1+7
1231		8841+y	J1+9	7610+y	J1+8
1281		5065	(21/2 ⁺)	3784	17/2 ⁽⁺⁾
1341@	0.42 18	1341+x	J+2	x	J≥(25/2)
1353@		7906+z	J2+8	6553+z	J2+7
1431		6842	(29/2 ⁺)	5411	(23/2 ⁺)
1455		1454+z	J2+2	z	J2
1491	1.90 20	2832+x	J+4	1341+x	J+2
1615		2304+z	J2+3	688+z	J2+1
1621		1621+y	J1+2	y	J1
1668	2.9 3	4500+x	J+6	2832+x	J+4
1708		4934	(21/2 ⁺)	3226	17/2 ⁺
1731		3784	17/2 ⁽⁺⁾	2053	13/2 ⁺
1734	0.10 5	2478+y	J1+3	744+y	J1+1
1775	0.15 5	3396+y	J1+4	1621+y	J1+2
1796		3250+z	J2+4	1454+z	J2+2
1859	0.17 3	4338+y	J1+5	2478+y	J1+3
1887	2.9 3	6387+x	J+8	4500+x	J+6
1934		4238+z	J2+5	2304+z	J2+3
1961	0.12 3	5357+y	J1+6	3396+y	J1+4
2063	0.17 3	6402+y	J1+7	4338+y	J1+5
2104		5353+z	J2+6	3250+z	J2+4
2121	2.8 3	8508+x	J+10	6387+x	J+8
2254	0.14 3	7610+y	J1+8	5357+y	J1+6
2314		6553+z	J2+7	4238+z	J2+5
2362	2.5 3	10870+x	J+12	8508+x	J+10
2439	0.13 3	8841+y	J1+9	6402+y	J1+7
2553		7906+z	J2+8	5353+z	J2+6
2663	2.2 3	13533+x	J+14	10870+x	J+12
2697	0.89 20	10307+y	J1+10	7610+y	J1+8
2817	0.59 20	11658+y	J1+11	8841+y	J1+9
2826		9379+z	J2+9	6553+z	J2+7
2987	0.29 15	13295+y	J1+12	10307+y	J1+10
3005	0.73 18	16538+x	J+16	13533+x	J+14
3123@		11029+z?	J2+10	7906+z	J2+8
3349	0.30 20	19887+x	J+18	16538+x	J+16

† From 2000Yu02.

‡ Read off by the evaluator from the intensity plot in FIG.3 of 2000Yu02.

Multiply placed.

@ Placement of transition in the level scheme is uncertain.

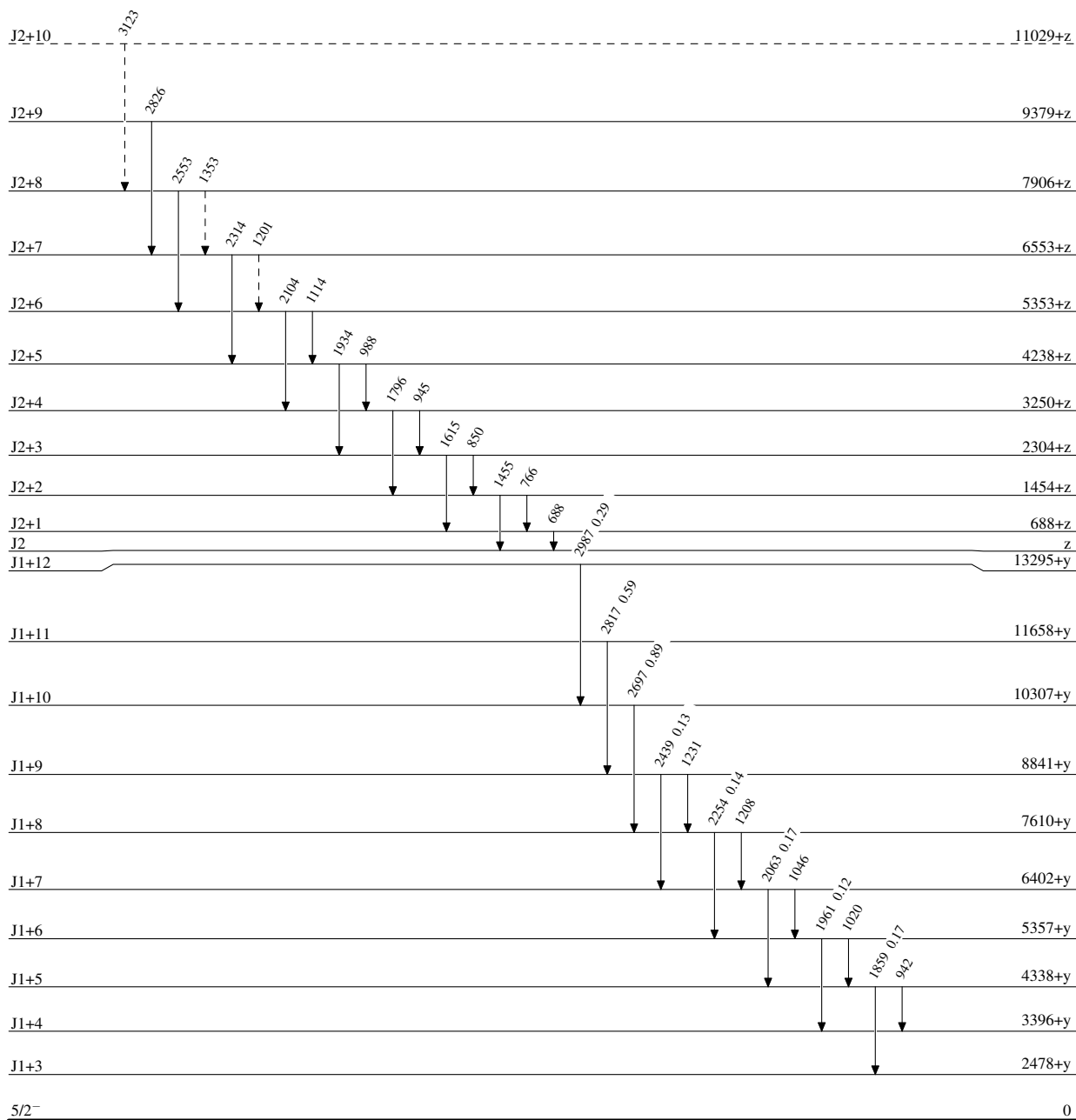
$^{40}\text{Ca}(^{29}\text{Si},4p\gamma)$ 2000Yu02

Legend

Level Scheme

Intensities: Relative I_γ

- ▶ $I_\gamma < 2\% \times I_\gamma^{max}$
- ▶ $I_\gamma < 10\% \times I_\gamma^{max}$
- ▶ $I_\gamma > 10\% \times I_\gamma^{max}$
- - - - -▶ γ Decay (Uncertain)



$^{65}_{30}\text{Zn}_{35}$

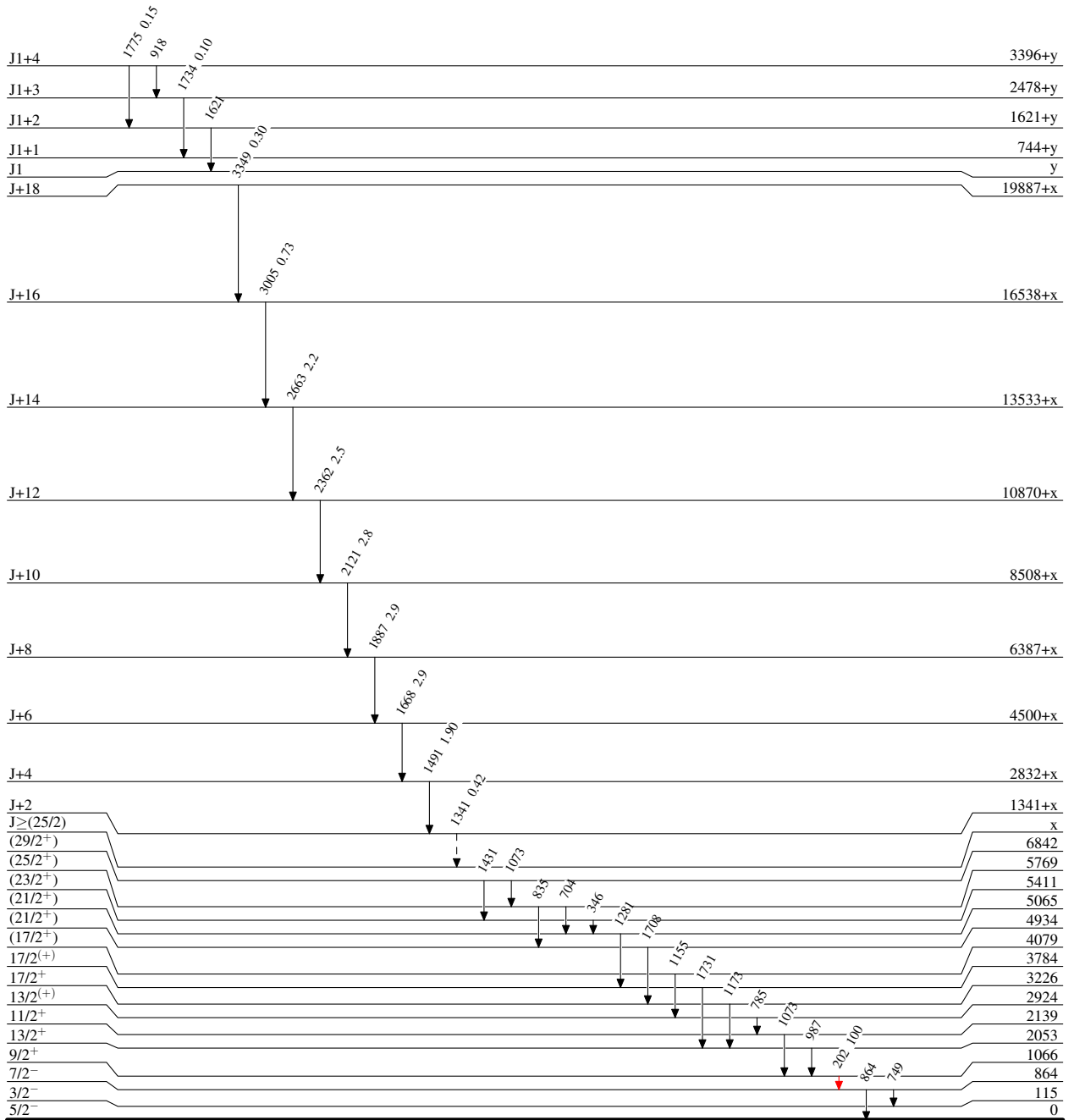
$^{40}\text{Ca}(^{29}\text{Si},4p\gamma)$ 2000Yu02

Level Scheme (continued)

Intensities: Relative I_γ

Legend

- ▶ $I_\gamma < 2\% \times I_\gamma^{max}$
- ▶ $I_\gamma < 10\% \times I_\gamma^{max}$
- ▶ $I_\gamma > 10\% \times I_\gamma^{max}$
- - -▶ γ Decay (Uncertain)



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