^{28}Si(^{19}F,2pnγ) 1974Ko22

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 190,1 (2023)	20-Jun-2023

1974Ko22: E=45-55 MeV ^{19}F beam produced from the BNL MP-tandem accelerators. Targets are natural ^{28}Si. γ rays were detected with Ge(Li) detectors. Measured Eγ, $\gamma(\theta)$, $\gamma\gamma$-coin, γ(lin pol), recoil distance. Deduced levels, J, π, $T_{1/2}$ using the Recoil Distance Method (RDM).

All data are from 1974Ko22, unless otherwise noted.

^{44}Sc Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	Comments
0.0	2^+		
67	1^-		
146	0^-		
234.85 *25*	2^-		
271.16 *15*	6^+	58.61 h *10*	$T_{1/2}$: from the Adopted Levels.
349.87 *10*	4^+	3.1 ns *3*	
424.77 *8*	(3^-)	380 ps *40*	
531.7 *3*	3^-	<35 ns	
631.09 *18*	4^-		
968.2 *3*	7^+	<3.5 ps	
1046.9? *2*			
1197.44 *12*	5^-		
1728.0 *5*			
2671.6 *3*	$(9)^+$	1.7 ps *3*	
3567.1 *3*	$(11)^+$	48.3 ps *17*	
3975.3 *4*	(13^+)		J$^\pi$: from the Adopted Levels.
4113 *1*	(10,11,12)	<0.35 ps	

[†] From a least-squares fit to γ-ray energies.
[‡] Proposed by 1974Ko22 based on $\gamma(\theta)$ and γ(lin pol) (1974Ko22). Exception is noted.
[#] From RDM in 1974Ko22.

γ(^{44}Sc)

E$_\gamma$[†]	I$_\gamma$[‡]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[#]	Comments
167 *1*		234.85	2^-	67	1^-		
190.0 *8*		424.77	(3^-)	234.85	2^-		
206.4 *5*		631.09	4^-	424.77	(3^-)	(M1)	A_2=−0.16 *6*
234.85 *25*	16.4 *25*	234.85	2^-	0.0	2^+	(E1)[@]	A_2=+0.07 *4*; A_4=+0.03 *4*; pol=−0.37 *17*
271.16 *15*	37.8 *19*	271.16	6^+	0.0	2^+	E4	A_2=+0.04 *8*; A_4=−0.10 *6*; pol=+0.01 *5*
281.2 *2*	11.5 *17*	631.09	4^-	349.87	4^+	E1	A_2=+0.30 *11*; A_4=−0.02 *10*; pol=−0.64 *26*
296.84 *20*		531.7	3^-	234.85	2^-	(M1)	A_2=−0.30 *11*; A_4=−0.04 *9*
349.87 *10*	38.2 *19*	349.87	4^+	0.0	2^+	E2	A_2=+0.17 *6*; A_4=−0.03 *5*; pol=+0.31 *9*
356.94 *12*		424.77	(3^-)	67	1^-	(E2)	A_2=+0.13 *7*; A_4=+0.01 *6*
396.26 *12*	11.9 *18*	631.09	4^-	234.85	2^-	E2	A_2=+0.23 *4*; A_4=−0.10 *3*; pol=+0.12 *12*
408.22 *15*	5.0 *25*	3975.3	(13^+)	3567.1	$(11)^+$	(E2)[@]	A_2=+0.29 *5*; pol=+0.10 *16*
424.74 *12*	3.6 *18*	424.77	(3^-)	0.0	2^+	(E1)	A_2=−0.30 *9*; pol=−0.5 *7* Mult.: it seems that authors′ assignment of (E1) is inconsistent with the measured and predicted pol values with the same sign which would indicate M1.
530.95 *15*		531.7	3^-	0.0	2^+	(E1)	A_2=−0.54 *6*
546 *1*		4113	(10,11,12)	3567.1	$(11)^+$	D	

Continued on next page (footnotes at end of table)

^{28}Si(^{19}F,2pnγ) 1974Ko22 (continued)

γ(^{44}Sc) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	Comments
566.39 *15*	8.0 *24*	1197.44	5^-	631.09	4^-	M1	A_2=−0.97 *7*; A_4=+0.04 *4*; pol=+0.20 *12* Mult.: it seems that authors′ assignment of M1 is inconsistent with the measured and predicted pol values with the same sign which would indicate E1.
681.1 *4*		1728.0		1046.9?			A_2=+0.25 *23*
697.04[&] *20*	114[&] *6*	968.2	7^+	271.16	6^+	M1	A_2=−0.39 *4*; A_4=+0.03 *3*; pol=−0.19 *4* E_γ,I_γ: authors of 1974Ko22 also place this γ from 1146.9 level but that placement is not confirmed in other studies. The intensity is probably mostly for the transition placed here.
697.04[&a] *20*	114[&] *6*	1046.9?		349.87	4^+		E_γ: the placement of this transition is not seen in other studies and considered as questionable by the evaluators. See the placement from 968.2 level.
772.50 *15*	11.9 *18*	1197.44	5^-	424.77	(3^-)	E2	A_2=+0.11 *8*; A_4=−0.05 *7*; pol=+0.22 *19*
848 *1*		1197.44	5^-	349.87	4^+		
895.49 *12*	71 *4*	3567.1	$(11)^+$	2671.6	$(9)^+$	E2	A_2=+0.30 *3*; A_4=−0.12 *3*; pol=+0.50 *11*
926.35 *15*		1197.44	5^-	271.16	6^+	(E1)	A_2=−0.11 *4*; A_4=−0.04 *8*
1703.31 *20*		2671.6	$(9)^+$	968.2	7^+	E2	A_2=+0.29 *4*; A_4=−0.12 *3*; pol=+0.49 *11*

[†] From 1974Ko22.
[‡] From 1974Ko22. Original values have been normalized to Iγ(1703γ)=100 by the evaluators. Based on authors′ generate statement of 1% to 15% for strong lines depending on peak separation and up to 50% for weak lines, the evaluators have assigned uncertainty as follows: 5% for Iγ>30, 10% for Iγ>20, 15% for Iγ>10, 30% for Iγ>5 and 50% for I$\gamma\leq$5.
[#] From 1974Ko22 based on measured $\gamma(\theta)$ and γ(lin pol) (1974Ko22), unless otherwise noted. Predicted polarization also given under comments is calculated from measured $\gamma(\theta)$ assuming pure M1 or E2 and the opposite sign compared to measured pol indicates pure E1 or M2 transition; the prediction is not valid for mixed transitions or for pure multipoles with L>2 (1974Ko22).
[@] Not given in 1974Ko22; assigned by the evaluators based on $\gamma(\theta)$ and γ(pol) compared with other assignments.
[&] Multiply placed with undivided intensity.
[a] Placement of transition in the level scheme is uncertain.

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Level Scheme

Intensities: Relative I_γ

& Multiply placed: undivided intensity given

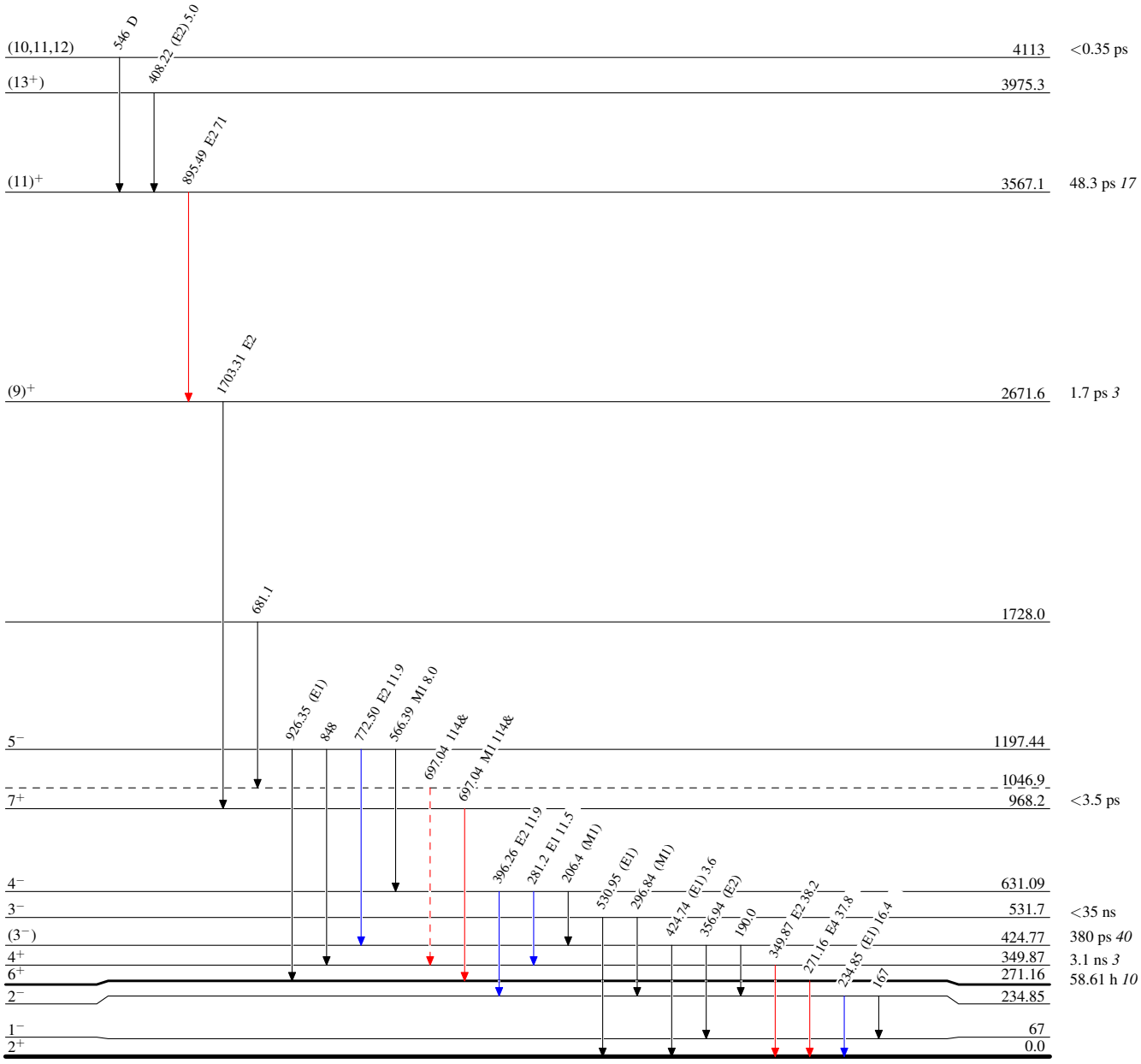
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



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