

$^{112}\text{Sn}(n,n'\gamma)$ 2005Ku28,2007Or04

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	S. Lalkovski, F. G. Kondev		NDS 124, 157 (2015)	1-Aug-2014

2005Ku28,2007Or04: Facility: 7 MV electrostatic accelerator at University of Kentucky; Beam: E(n)=2.5 to 4.5 MeV from $^3\text{H}(p,n)^3\text{He}$ reaction; Target: 4 g enriched to 99.5% in ^{112}Sn ; Detectors: one BGO Compton-suppressed HPGe detector; Measured: Excitation function with neutrons at energies of 2.5 to 4.0 MeV, $E\gamma$, $I\gamma$, $\gamma(\theta)$, τ , n-TOF; Deduced: δ , γ -ray Mult., J^π , ^{112}Sn level scheme; Also, from the same collaboration: [2005Ku37](#).
Other: [1981KuZQ](#), [1979De37](#).

 ^{112}Sn Levels

E(level) [†]	J^π [‡]	$T_{1/2}$ [#]	Comments
0.0	0 ⁺		
1256.69 4	2 ⁺	0.37 ps +7-6	
2150.87@ 5	2 ⁺		
2190.82@ 6	0 ⁺	>0.5 ps	
2247.41@ 6	4 ⁺		
2354.19 7	3 ⁻	0.35 ps +14-8	
2476.05 12	2 ⁺	>2.4 ps	
2520.68 8	4 ⁺	>0.8 ps	
2549.25 14	6 ⁺	>0.5 ps	
2617.62 18	0 ⁺	>0.4 ps	
2721.07 14	2 ⁺	0.8 ps +10-3	
2756.01 22	3 ⁺	>0.8 ps	
2765.2 3		>1.0 ps	
2783.90 21	4 ⁺	0.31 ps +10-6	
2913.10 22	4 ⁺	>0.6 ps	
2917.42 11	2 ⁺ ,3,4 ⁺	>1.1 ps	
2927.9 4	6 ⁺	>0.22 ps	
2945.36 17	4 ⁺	>1.1 ps	
2966.62 8	2 ⁺	0.5 ps +8-2	
2969.31 6		0.29 ps +21-9	
2986.4 3	0 ⁺	>1.7 ps	
3078.53 14	(2,3) ⁺	>1.2 ps	
3092.20 10	2 ⁺	0.25 ps +8-5	
3113.55 15	0 ⁺ to 4 ⁺		
3133.43& 11	5 ⁻	>1.0 ps	
3141.1 4			
3149.0 4	4 ⁺	0.6 ps +10-2	
3248.68 10	2 ⁺	>1.1 ps	
3272.31 16	4 ⁺	0.30 ps +21-10	
3283.61 21	2 ⁺		
3286.18 15	(2 ⁺)	0.22 ps +15-7	
3288.0 3	(1,2 ⁺)		
3338.3 3	2 ⁺	>0.3 ps	
3353.1 4	2 ⁺	>1.4 ps	
3378.9 3	0 ⁺ to 4 ⁺		
3384.0& 3	(3) ⁻	0.18 ps +8-5	
3397.19& 12	2 ⁻ ,3 ⁻	0.23 ps +10-6	$T_{1/2}$: 0.13 +13-5 in Table iv in (2005Ku28).
3413.43 18	6 ⁺		
3417.42 11	4 ⁺	>0.4 ps	
3433.4& 5	(1 ⁻)	1.9 fs +11-10	
3456.1 3	2 ⁺ ,3 ⁺	>0.7 ps	
3471.7 3	4 ⁺	>0.23 ps	

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$^{112}\text{Sn}(n,n'\gamma)$ 2005Ku28,2007Or04 (continued) ^{112}Sn Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	E(level) [†]	J ^π [‡]	T _{1/2} [#]
3494.02 21	2 ⁺ to 6 ⁺		3604.92 12		
3499.19 16	5 ⁻	0.04 ps +4-2	3610.97 11		0.8 ps +4-2
3520.44 20	1 to 4 ⁺		3631.03 24		
3524.16 18	2 ⁺	>0.12 ps	3654.34 15	2 ⁺	
3529.8 5	2 ⁺ ,3,4 ⁺		3726.22 21		
3553.7 3	(3) ⁻	0.17 ps +11-6	3754.4 3		
3557.27 12		>0.3 ps	3782.9 3		

[†] From a least-squares fit to E_γ.

[‡] From the Adopted Levels.

[#] From DSAM measurements in 2005Ku28.

@ Possible member of the two-phonon multiplet.

& Possible member of the 2⁺×3⁻ multiplet.

 $\gamma(^{112}\text{Sn})$

E _γ [†]	I _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [†]	δ [†]	Comments
203.2 2		2354.19	3 ⁻	2150.87	2 ⁺			
301.84 13	1.00	2549.25	6 ⁺	2247.41	4 ⁺	E2		Mult.: possible admixture; δ(D/Q)=-0.2 1 (2005Ku28).
378.6 3	1.0	2927.9	6 ⁺	2549.25	6 ⁺			
380.8 2	1.0	3529.8	2 ⁺ ,3,4 ⁺	3149.0	4 ⁺			
392.8 5	0.08 2	2913.10	4 ⁺	2520.68	4 ⁺			
468.07 6		3413.43	6 ⁺	2945.36	4 ⁺	E2		
508.8 3	0.85 1	2756.01	3 ⁺	2247.41	4 ⁺	M1+E2	0.2 1	
552.5 2		3631.03		3078.53	(2,3) ⁺			
557.8 3		3078.53	(2,3) ⁺	2520.68	4 ⁺			
612.4 1	0.08 2	2966.62	2 ⁺	2354.19	3 ⁻	E1		
665.6 3	0.68 2	2913.10	4 ⁺	2247.41	4 ⁺			
669.9 1	1.0	2917.42	2 ⁺ ,3,4 ⁺	2247.41	4 ⁺			
767.0 2		2917.42	2 ⁺ ,3,4 ⁺	2150.87	2 ⁺			
772.44 24	0.03 4	3248.68	2 ⁺	2476.05	2 ⁺			
779.3 2	0.14 1	3133.43	5 ⁻	2354.19	3 ⁻	E2		
794.5 2		2945.36	4 ⁺	2150.87	2 ⁺	E2		
818.43 6		2969.31		2150.87	2 ⁺			
886.0 1	0.86 1	3133.43	5 ⁻	2247.41	4 ⁺	E1		Mult.: possible admixture; δ(D/Q)=-0.02 +1-4 (2005Ku28).
894.17 4	0.83 1	2150.87	2 ⁺	1256.69	2 ⁺	M1+E2	-0.28 6	δ: Also: 7 +3-2 (2005Ku28).
894.2 2		3248.68	2 ⁺	2354.19	3 ⁻			
901.8 6		3149.0	4 ⁺	2247.41	4 ⁺			
927.7 2	0.53 1	3078.53	(2,3) ⁺	2150.87	2 ⁺	M1+E2	0.60 +1-2	δ: Also: 3.0 10 (2005Ku28).
934.12 4	1.0	2190.82	0 ⁺	1256.69	2 ⁺	E2		Mult.: possible admixture; δ(D/Q)=-0.04 4 (2005Ku28).
951.0 3	1.0	3471.7	4 ⁺	2520.68	4 ⁺			
962.67 14	1.0	3113.55	0 ⁺ to 4 ⁺	2150.87	2 ⁺			
979.3 2	0.35 3	3499.19	5 ⁻	2520.68	4 ⁺			
990.2 4	1.0	3141.1		2150.87	2 ⁺			
990.69 4	1.0	2247.41	4 ⁺	1256.69	2 ⁺	E2		
1036.1 4	0.14 2	3557.27		2520.68	4 ⁺			
1036.2 2	1.0	3283.61	2 ⁺	2247.41	4 ⁺			
1042.95 11	0.42 1	3397.19	2 ⁻ ,3 ⁻	2354.19	3 ⁻	(M1+E2)	1.8 12	

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$^{112}\text{Sn}(n,n'\gamma)$ **2005Ku28,2007Or04** (continued) $\gamma(^{112}\text{Sn})$ (continued)

E_γ †	I_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. †	δ †	Comments
1097.2 3	1.0	3288.0	(1,2 ⁺)	2190.82	0 ⁺			
1097.38 7	1.0	2354.19	3 ⁻	1256.69	2 ⁺	E1		Mult.: possible admixture; $\delta(D/Q)=0.02$ 2 (2005Ku28).
1097.4 2		3248.68	2 ⁺	2150.87	2 ⁺			
1121.39 15	0.21 7	3272.31	4 ⁺	2150.87	2 ⁺	E2		
1144.2 2	0.65 3	3499.19	5 ⁻	2354.19	3 ⁻			
1165.33		3413.43	6 ⁺	2247.41	4 ⁺	E2		
1166.3 2		3520.44	1 to 4 ⁺	2354.19	3 ⁻			
1203.1 1	0.86 2	3557.27		2354.19	3 ⁻			
1219.34 13	0.17 2	2476.05	2 ⁺	1256.69	2 ⁺	M1+E2	-0.54 7	
1228.0 3	1.0	3378.9	0 ⁺ to 4 ⁺	2150.87	2 ⁺			
1246.6 3	0.58 1	3397.19	2 ⁻ ,3 ⁻	2150.87	2 ⁺			
1246.6 2	1.0	3494.02	2 ⁺ to 6 ⁺	2247.41	4 ⁺			
1256.68 4	1.0	1256.69	2 ⁺	0.0	0 ⁺	E2		
1264.07 7	1.00	2520.68	4 ⁺	1256.69	2 ⁺	E2		Mult.: possible admixture; $\delta(D/Q)=-0.04$ 4 (2005Ku28).
1276.5 4		3524.16	2 ⁺	2247.41	4 ⁺	E2		
1357.5 1	1.0	3604.92		2247.41	4 ⁺			
1360.92 17	1.0	2617.62	0 ⁺	1256.69	2 ⁺	E2		
1369.0 6		3520.44	1 to 4 ⁺	2150.87	2 ⁺			
1460.1 1		3610.97		2150.87	2 ⁺			
1464.22 15	0.73 5	2721.07	2 ⁺	1256.69	2 ⁺	M1+E2	0.17 10	
1499.1 3	0.15 1	2756.01	3 ⁺	1256.69	2 ⁺	M1(+E2)	0.03 5	
1507.0 3	1.0	3754.4		2247.41	4 ⁺			
1508.5 3	1.0	2765.2		1256.69	2 ⁺			
1527.2 2	1.0	2783.90	4 ⁺	1256.69	2 ⁺	E2		Mult.: possible admixture; $\delta(D/Q)=-0.06$ 4 (2005Ku28).
1632.0 3	1.0	3782.9		2150.87	2 ⁺			
1656.3 4	0.24 2	2913.10	4 ⁺	1256.69	2 ⁺	E2		Mult.: possible admixture; $\delta(D/Q)=-0.11$ 11 (2005Ku28).
1688.7 3	1.0	2945.36	4 ⁺	1256.69	2 ⁺	E2		
1709.9 4	0.25 6	2966.62	2 ⁺	1256.69	2 ⁺	M1(+E2)	0.3 4	
1712.61 6	1.0	2969.31		1256.69	2 ⁺			
1729.7 3	1.0	2986.4	0 ⁺	1256.69	2 ⁺	E2		
1821.8 2	0.47 1	3078.53	(2,3) ⁺	1256.69	2 ⁺	M1+E2	-1.3 +3-5	
1836.0 3	0.37 10	3092.20	2 ⁺	1256.69	2 ⁺	M1+E2	-1.5 10	
1892.2 5	1.0	3149.0	4 ⁺	1256.69	2 ⁺	E2		Mult.: possible admixture; $\delta(D/Q)=0.05$ 10 (2005Ku28).
1992.25 12	0.02 4	3248.68	2 ⁺	1256.69	2 ⁺	M1+E2		
2016.1 5	0.79 7	3272.31	4 ⁺	1256.69	2 ⁺	E2		Mult.: possible admixture; $\delta(D/Q)=0.0$ 1 (2005Ku28).
2029.4 2	0.07 3	3286.18	(2 ⁺)	1256.69	2 ⁺	M1(+E2)	0.1 +3-2	δ : Also: 1.8 10 (2005Ku28).
2081.6 3	1.00	3338.3	2 ⁺	1256.69	2 ⁺	M1+E2		
2096.4 4	0.08 3	3353.1	2 ⁺	1256.69	2 ⁺	M1+E2		
2127.3 3	1.00	3384.0	(3) ⁻	1256.69	2 ⁺	E1		Mult.: possible admixture; $\delta(D/Q)=0.01$ 5. Also, 0.013 5 in table IV in (2005Ku28).
2150.9 4	0.17 1	2150.87	2 ⁺	0.0	0 ⁺	E2		
2160.7 1	1.0	3417.42	4 ⁺	1256.69	2 ⁺	E2		Mult.: $\delta=0.5 +10-5$ (2005Ku28).
2199.4 3	1.0	3456.1	2 ⁺ ,3 ⁺	1256.69	2 ⁺	M1+E2	2.8 10	
2267.5 2		3524.16	2 ⁺	1256.69	2 ⁺	M1(+E2)	-0.1 4	
2297.0 3	1.0	3553.7	(3) ⁻	1256.69	2 ⁺			
2354.1 5	1.0	3610.97		1256.69	2 ⁺			
2397.6 2		3654.34	2 ⁺	1256.69	2 ⁺	M1+E2	0.52 6	
2469.5 2	1.0	3726.22		1256.69	2 ⁺			
2475.8 3	0.83 2	2476.05	2 ⁺	0.0	0 ⁺	E2		

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$^{112}\text{Sn}(n,n'\gamma)$ 2005Ku28,2007Or04 (continued) $\gamma(^{112}\text{Sn})$ (continued)

E_γ^\dagger	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [†]	Comments
2721.6 3	0.27 5	2721.07	2 ⁺	0.0	0 ⁺	E2	
2966.6 1	0.67 8	2966.62	2 ⁺	0.0	0 ⁺	E2	
3092.1 1	0.63 10	3092.20	2 ⁺	0.0	0 ⁺	E2	
3248.8 8	0.95 2	3248.68	2 ⁺	0.0	0 ⁺	E2	
3286.2 2	0.93 3	3286.18	(2 ⁺)	0.0	0 ⁺		
3353.0 5	0.92 3	3353.1	2 ⁺	0.0	0 ⁺	E2	
3433.3 5	1.0	3433.4	(1 ⁻)	0.0	0 ⁺	E1	
3524.2 10		3524.16	2 ⁺	0.0	0 ⁺	E2	
3654.3 2		3654.34	2 ⁺	0.0	0 ⁺	E2	

Mult.: assigned by the evaluators; Other: M1+E2 with $\delta=0.48$ δ in $^{112}\text{Sn}(n,n'\gamma)$ (2005Ku28) is not consistent with the J^π assignments.

[†] From 2005Ku28, unless otherwise stated.

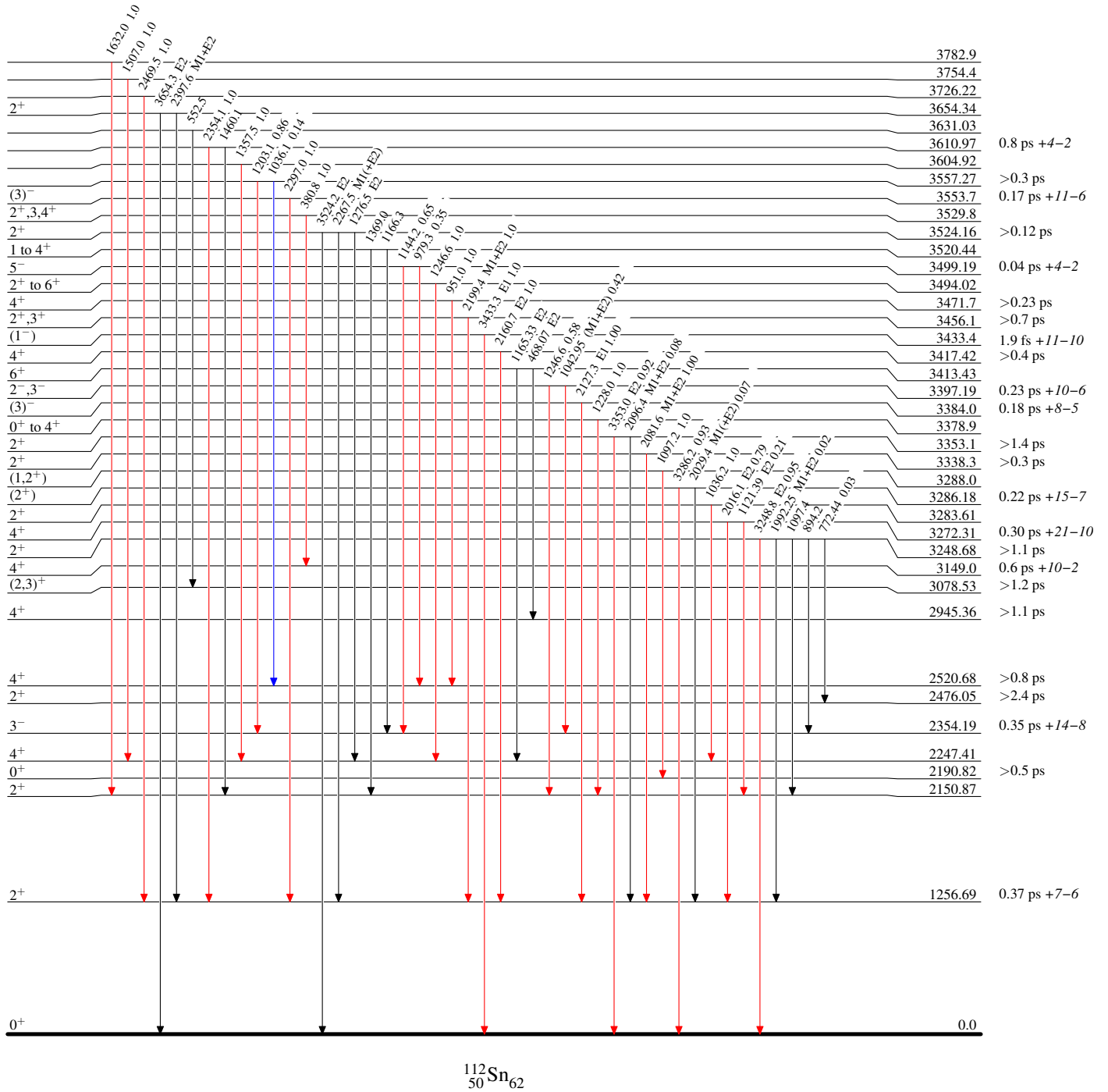
$^{112}\text{Sn}(n,n'\gamma)$ 2005Ku28,2007Or04

Level Scheme

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$



$^{112}\text{Sn}(n,n'\gamma)$ 2005Ku28,2007Or04

Level Scheme (continued)

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- $I_\gamma > 10\% \times I_\gamma^{\text{max}}$

