^{64}Ni(d,pγ) 2017Cr04,1978Mu05,2006Ge16

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

Adapted from a XUNDL dataset for 2017Cr04, compiled by B. Singh (McMaster University) on August 20, 2017.

2017Cr04: E=12.5 MeV deuteron beam was produced from the Oslo Cyclotron Laboratory (OCL). Target was self-supporting 99% enriched ^{64}Ni of 1 mg/cm^2 thickness. Charged particles were detected with the Silicon Ring (SiRi) particle-detector array (FWHM≈120 keV) at 692 keV; γ rays were detected with the CACTUS array of 26 collimated NaI(Tl) detectors (FWHM≈70 keV at 1017 keV). Timing resolution (FWHM) for coincidence measurement was ≈15 ns. Measured particle spectra, Eγ, (particle)γ-coin. Deduced levels, nuclear level-density (NLD) and gamma-strength function (γSF). The experiment is mainly about determination of nuclear level density (NLD) and γ-strength function (γSF) of ^{65}Ni by the Oslo method.

1978Mu05: E=8 MeV pulsed deuteron beam was produced from the FN tandem accelerator at ANL. Target was 2 mg/cm^2 98% enriched ^{64}Ni. γ rays were detected with a Si(Li) detector. Measured Eγ, γ(t). Deduced isomer $T_{1/2}$.

2006Ge16,2005Ge09: E=6 MeV pulsed deuteron beam was produced from Orsay tandem accelerator. Target was >95% enriched ^{64}Ni. γ rays were detected with a pair of Ge and a pair BaF_2 detectors. Measured Eγ, Iγ, Time-Dependent Perturbed Angular Distribution (TDPAD). Deduced $T_{1/2}$ and g-factor for the J^π=9/2$^+$ state at 1017 MeV.

1978Ho06: E=12 MeV deuteron beam was produced from the tandem Van de Graaff accelerator at ANL. γ rays were detected with a small Ge(Li) detector. Measured γ(t). Deduced isomer $T_{1/2}$.

^{65}Ni Levels

Previously reported levels at 1594 and 1772 keV were not seen in the present work. Authors suggest that these levels need to be confirmed.

E(level)	J^π[†]	$T_{1/2}$	Comments
0	5/2$^-$		
63.36 *5*	1/2$^-$	68.6 μs *35*	E(level): from Eγ. $T_{1/2}$: weighted mean of 66.5 μs *35* from γ(t) in 1978Ho06 and 73 μs *5* from delayed γ(t) in 1978Mu05, both with a pulsed beam.
310[‡]	3/2$^-$		
693[‡]	3/2$^-$		
1017[‡]	9/2$^+$	22 ns *2*	$T_{1/2}$: From γ(t) in 2006Ge16,2005Ge09. g-factor=−0.296 *3* by TDPAD in 2006Ge16,2005Ge09.
1142[‡]	(5/2$^-$,7/2$^-$)		E(level): 1141 listed in Fig. 7 of 2017Cr04.
1609	7/2$^-$		E(level): level energy mentioned in the text in the context of 1609 -> 310 ->0 cascade seen in particle-γ coin spectrum in 2017Cr04.
1920[‡]	5/2$^+$		
≈2320[@]			E(level): from text, listed as 2300 in Table II of 2017Cr04. This level corresponds to known levels at 2302, 2325 and 2336.
≈2480[@]			
≈2790[@]			
≈3340[@]			
≈3530[@]			
≈4100[@]			
≈4520[#]			
≈4770[#]			
≈5020[#]			
≈5270[#]			
≈5510[#]			
≈5760[#]			

Continued on next page (footnotes at end of table)

^{64}Ni(d,pγ) 2017Cr04,1978Mu05,2006Ge16 (continued)

^{65}Ni Levels (continued)

† From Adopted Levels.
‡ Rounded value from ^{65}Ni Adopted Levels in ENSDF database.
# Read from Fig. 4 of 2017Cr04.
@ From Table II and/or Fig. 7 of 2017Cr04.

$\gamma(^{65}Ni)$

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
63.36 *5*	63.36	$1/2^-$	0	$5/2^-$		E_γ: from 1978Mu05.
310	310	$3/2^-$	0	$5/2^-$		
630	693	$3/2^-$	63.36	$1/2^-$		
1017	1017	$9/2^+$	0	$5/2^-$		
1150 *80*	≈2320		1142	$(5/2^-,7/2^-)$		
1210 *90*	1920	$5/2^+$	693	$3/2^-$	[E1]	E_γ: new γ transition proposed by 2017Cr04.
129×10^1 *10*	≈2320		1017	$9/2^+$		
1299	1609	$7/2^-$	310	$3/2^-$		E_γ: from level-energy difference.
146×10^1 *10*	≈2480		1017	$9/2^+$		
210×10^1 *15*	≈2790		693	$3/2^-$		
249×10^1 *16*	≈2790		310	$3/2^-$		
274×10^1# *18*	≈2790		63.36	$1/2^-$		
302×10^1 *20*	≈3340		310	$3/2^-$		
322×10^1 *21*	≈3530		310	$3/2^-$		
≈3300‡	≈4520		1142	$(5/2^-,7/2^-)$		
404×10^1# *20*	≈4100		63.36	$1/2^-$		E_γ: implied from transition shown in Fig. 7 of 2017Cr04.
≈4450‡#	≈4520		63.36	$1/2^-$		
≈4600‡	≈5760		1142	$(5/2^-,7/2^-)$		
≈4700‡#	≈4770		63.36	$1/2^-$		
≈4850‡#	≈5020					
≈5200‡#	≈5270		63.36	$1/2^-$		
≈5400‡#	≈5510					
≈5700‡#	≈5760		63.36	$1/2^-$		

† From 2017Cr04, unless otherwise noted.
‡ Read from Fig. 4 of 2017Cr04. Uncertainty is probably ≈200 keV, as for γ rays near 3 MeV in authors′ Table II.
# The transition feeds the ground state and/or 63 level.

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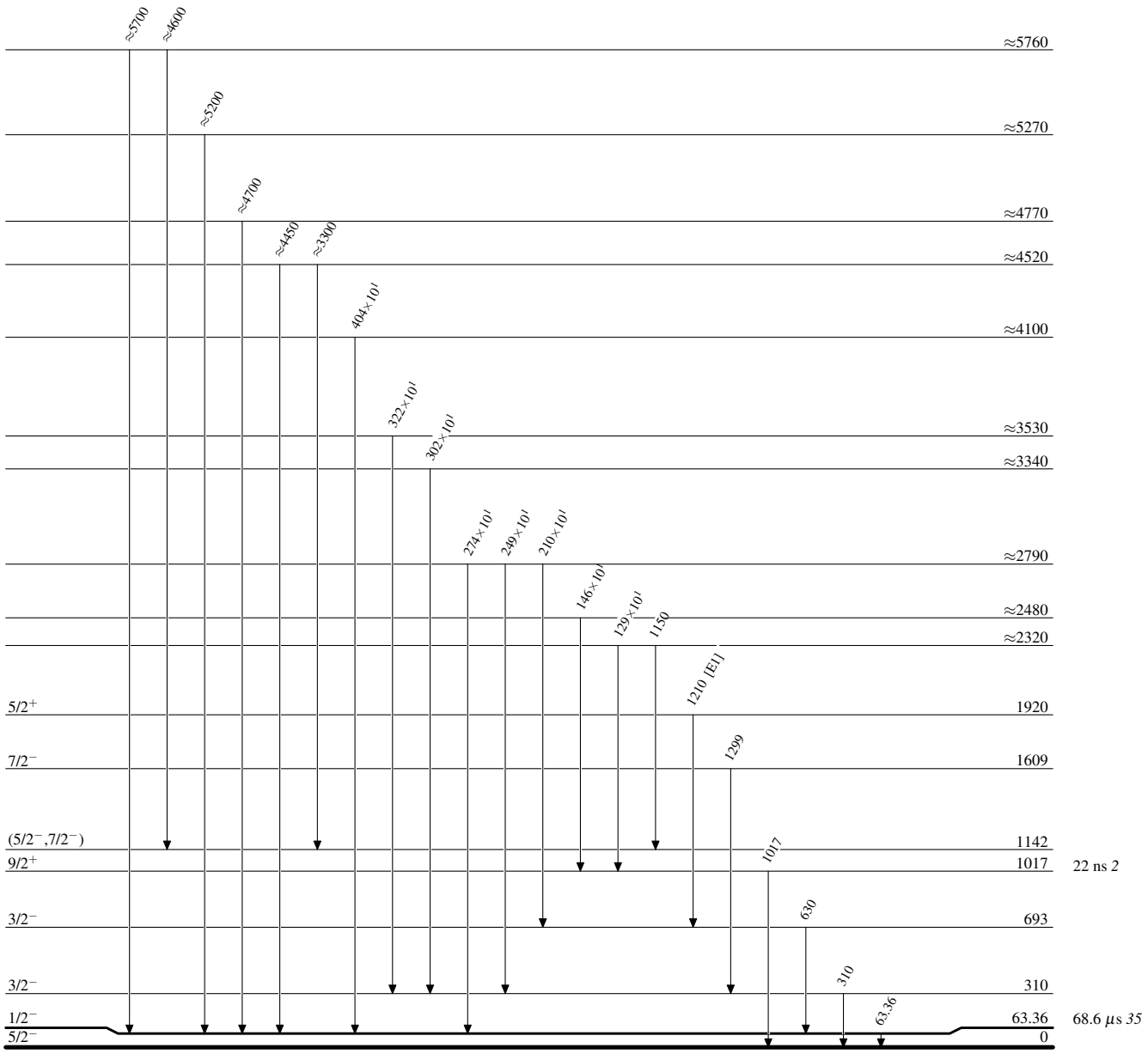
Level Scheme



$^{65}_{28}Ni_{37}$