$^{238}U(^{64}Ni,X\gamma)$ 2006Ho20,2007Lu13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178, 41 (2021).	12-Nov-2021

2006Ho20: E(^{64}Ni)=430 MeV, ≈25% above the Coulomb barrier. Measured Eγ, Iγ, $\gamma\gamma$-coin (3-fold or higher), and $\gamma\gamma(\theta)$ using Gammasphere array of 100 Compton-suppressed HPGe detectors at the ANL-ATLAS facility. Comparisons with shell-model calculations.
Additional information 1.
2007Lu13 (also 2010Fi09): E(^{64}Ni)=400 MeV beam provided by LNL Tandem-ALPI accelerator. Measured fragments, Eγ, Iγ, and $\gamma\gamma$-coin using PRISMA large acceptance magnetic spectrometer, and CLARA array of 25 Compton-suppressed Clover Ge detectors. Comparisons with shell-model calculations.

^{64}Fe Levels

E(level)[†]	J$^\pi$[‡]	Comments
0.0[#]	0^+	
746.4[#] *1*	2^+	
1763.1[#] *2*	4^+	
2840.9 *3*	$5^{(-)}$	
2842.0[#] *4*	6^+	
3422.9 *4*	(7^-)	
3528.9 *4*		J$^\pi$: >6.
3623.0[#] *4*	(8^+)	
4628.4 *6*	(10^+)	

[†] From Eγ data.
[‡] As proposed by 2006Ho20 based on $\gamma\gamma(\theta)$ data, yrast sequence and comparisons with structure in ^{72}Se. The assignments in the Adopted Levels are the same, except that some are given in parentheses there due to lack of strong arguments.
[#] Band(A): Yrast cascade.

$\gamma(^{64}Fe)$

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[@]	Comments
582.0 *2*	12 *1*	3422.9	(7^-)	2840.9	$5^{(-)}$		
686.9 *2*	20 *2*	3528.9		2842.0	6^+		
746.4[#] *1*		746.4	2^+	0.0	0^+	Q	Eγ=746.4 *1*, Iγ not given (2006Ho20). Eγ=746.0 *2*, Iγ=100 *8* (2007Lu13). (746γ)(1017γ gate)(θ): A$_2$=+0.14 *3*, A$_4$=+0.01 *4* (2006Ho20).
781.0 *1*	30 *2*	3623.0	(8^+)	2842.0	6^+	Q	Eγ=781.0 *1*, Iγ=30 *2* (2006Ho20). Eγ=781.3 *4*, Iγ=16 *3* (2007Lu13). (781γ)(1017γ+1079γ gate)(θ): A$_2$=+0.11 *3*, A$_4$=−0.06 *5* (2006Ho20).
1005.4 *5*	6 *1*	4628.4	(10^+)	3623.0	(8^+)		
1016.7[#] *1*	100	1763.1	4^+	746.4	2^+	Q	Eγ=1016.7 *1*, Iγ=100 (2006Ho20). Eγ=1016.7 *3*, Iγ=79 *9* (2007Lu13). (1017γ)(746γ gate)(θ): A$_2$=+0.14 *3*, A$_4$=−0.09 *3* (2006Ho20).
1077.8 *2*	12[‡] *3*	2840.9	$5^{(-)}$	1763.1	4^+	D+Q	Eγ=1077.8 *2*, Iγ=12 *3* (2006Ho20). (1078γ)(1017γ gate)(θ): A$_2$=−0.13 *6*, A$_4$=+0.22 *8* (2006Ho20).
1078.9 *3*	50[‡] *7*	2842.0	6^+	1763.1	4^+	Q	Eγ=1078.9 *3*, Iγ=50 *7* (2006Ho20).

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^{238}U(^{64}Ni,Xγ) 2006Ho20,2007Lu13 (continued)

γ(^{64}Fe) (continued)

E_γ [†]	E_i(level)	Comments
		Eγ=1077.5 *4*, Iγ=54 *7* (2007Lu13); note that 1078γ is a doublet in 2006Ho20, but only one line is listed in 2007Lu13. (1079γ)(1017γ gate)(θ): A_2=+0.31 *5*, A_4=−0.11 *7*.

[†] From 2006Ho20 unless otherwise stated. Available values from 2007Lu13 are listed under comments and considered in the Adopted dataset.
[‡] From $\gamma\gamma$ coin data and decay and feeding pattern. Combined Iγ for 1077.8+1078.9=58 *3* (2006Ho20).
[#] The assignment of 746γ and 1017γ to ^{64}Fe is also indicated in the analysis of deep inelastic reaction: ^{208}Pb(^{48}Ca,Xγ) (as reported in 2002Ja16). Double-gated by 746γ and 1017γ, the spectrum shows peaks from partner nuclei ^{186}Os and ^{184}Os (Fig. 2b in 2006Ho20).
[@] Implied from $\gamma\gamma(\theta)$ in 2006Ho20, mult=Q corresponds to ΔJ=2, quadrupole (most likely E2) and mult=D+Q corresponds to ΔJ=1.

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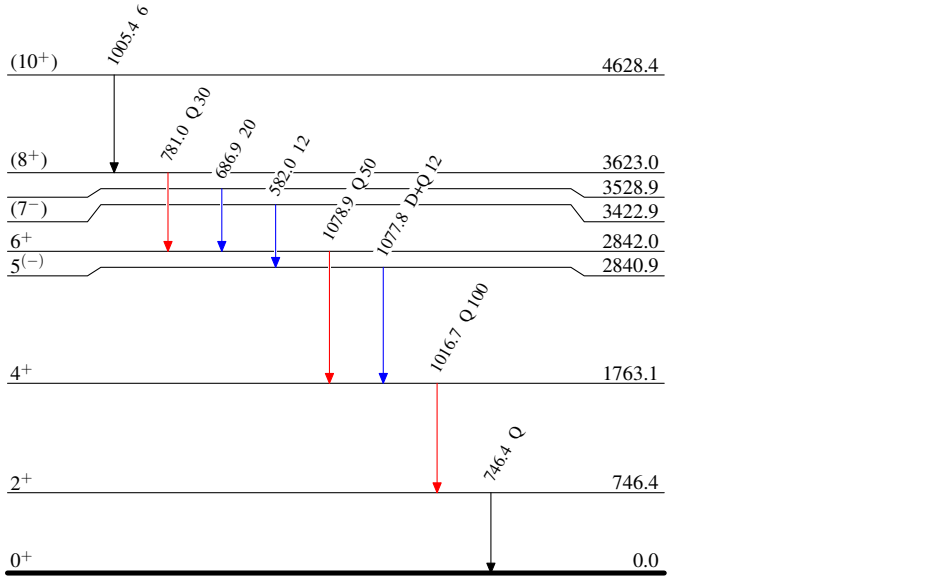
Level Scheme

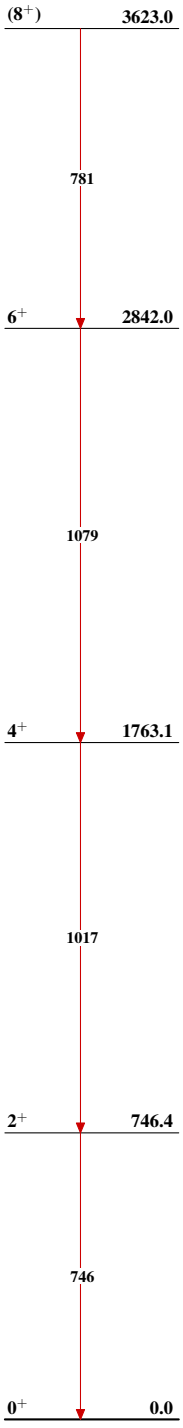
Intensities: Relative I$_\gamma$



$^{64}_{26}Fe_{38}$

^{238}U(^{64}Ni,Xγ) 2006Ho20,2007Lu13

Band(A): Yrast cascade



$^{64}_{26}Fe_{38}$