^{58}Ni(^{40}Ca,αpnγ) 1997Ka07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 113, 2187 (2012)	15-Sep-2012

Other: 1999Zh04.

1999Zh04: E(^{40}Ca)=150 MeV; 90% enriched ^{58}Ni target; four HPGe detectors; measured Eγ (four transitions observed).

1997Ka07: E=180 MeV; thick 99.8% ^{58}Ni target; NORDBALL array (15 Compton-suppressed Ge detectors at θ=79°, 101° and 143°), 11 forward-angle neutron detectors, 20-detector Si ball for α detection; measured Eγ, Iγ (unstated), $\gamma\gamma$ coin, anisotropy ratio defined as 2Iγ(143°)/[Iγ(101°)+Iγ(79°)]; shell-model calculations.

The level scheme from 1997Ka07 is shown here for completeness. However, it differs from the adopted level scheme In several respects: the 632γ is placed to feed the (13/2$^-$) 2844 level from a second (13$^-$) level instead of making it part of the 1419γ-1034γ-939γ-936γ cascade, and the order of the 939γ-1034γ cascade is reversed here.

^{92}Rh Levels

E(level)†	J$^\pi$‡	Comments
0.0#&	(6$^+$)#	
235& *1*	(8$^+$)	
599.1& *13*	(9$^+$)	
1270.9& *13*	(10$^+$)	
1548.6& *14*	(11$^+$)	
1845.9? *17*		
2151.7@ *15*	(11$^-$)	
2536.6& *17*	(13$^+$)	
2607.7@ *17*	(12$^-$)	
2843.7@ *17*	(13$^-$)	
3196.6& *20*	(15$^+$)	
3475.7 *20*	(13$^-$)	level not adopted; adopted 632γ placement differs.
3779.7@ *20*	(15$^-$)	
4313.6& *23*	(17$^+$)	
4718.7@ *22*	(17$^-$)	E=4814 and J undetermined if order of 939γ-1034γ cascade is reversed. adopted J$^\pi$=(16$^-$).
5418.6& *25*	(19$^+$)	
5752.7@ *25*	(19$^-$)	J$^\pi$: adopted value is (18$^-$).
6029 *3*		
6305 *3*		
7172@ *3*	(21$^-$)	adopted J$^\pi$=(19$^-$) and E=6385 or 7172 depending on order of 1419γ-632γ cascade.

† From least-squares fit to Eγ, allowing ΔE_γ=1 keV for all transitions.

‡ Tentative values suggested by 1997Ka07, based on measured transition anisotropy ratios and comparison of E(level) with energies predicted by shell-model calculations in the ($p_{1/2}$, $g_{9/2}$) model space.

Shell-model calculations predict a 6$^+$ level≈200 keV below an 8$^+$ level (unlike several neighboring nuclides, where the 6$^+$ lies 100-200 keV above the 8$^+$). The strongest transition (237γ) observed in (^{40}Ca,αpnγ) is preceded by a 1036γ which fits the energy systematics for yrast 10$^+$ to 8$^+$ transitions in neighboring nuclides.

@ Band(A): π=−, yrast states.

& Band(B): π=+, yrast states.

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γ(^{92}Rh)

Eγ†	Ei(level)	J^π_i	Ef	J^π_f	Mult.‡	Comments
235	235	(8+)	0.0	(6+)		Mult.: γ anisotropy ratio=1.05 *3* for 235γ+236γ doublet.
236	2843.7	(13−)	2607.7	(12−)		Mult.: γ anisotropy ratio=1.05 *3* for 235γ+236γ doublet.
276	6305		6029			Mult.: γ anisotropy ratio=0.78 *4* for 278γ+276γ doublet.
278	1548.6	(11+)	1270.9	(10+)		Mult.: γ anisotropy ratio=0.78 *4* for 278γ+276γ doublet.
307#	2151.7	(11−)	1845.9?			
364	599.1	(9+)	235	(8+)	D	Mult.: γ anisotropy ratio=0.78 *2*.
456	2607.7	(12−)	2151.7	(11−)	D	Mult.: γ anisotropy ratio=0.62 *3*.
575#	1845.9?		1270.9	(10+)		
603	2151.7	(11−)	1548.6	(11+)		
610	6029		5418.6	(19+)		
632	3475.7	(13−)	2843.7	(13−)		Mult.: γ anisotropy ratio=1.56 *12*; interpreted as D, ΔJ=0 by 1997Ka07, but also consistent with Q, ΔJ=2.
660	3196.6	(15+)	2536.6	(13+)	Q	Mult.: γ anisotropy ratio=1.53 *7*.
672	1270.9	(10+)	599.1	(9+)	D+Q	Mult.: γ anisotropy ratio=0.40 *5*.
692	2843.7	(13−)	2151.7	(11−)	Q	Mult.: γ anisotropy ratio=1.66 *12*.
881	2151.7	(11−)	1270.9	(10+)	D	Mult.: γ anisotropy ratio=0.74 *4*.
936	3779.7	(15−)	2843.7	(13−)	Q	Mult.: γ anisotropy ratio=1.55 *8*.
939	4718.7	(17−)	3779.7	(15−)	Q	Mult.: γ anisotropy ratio=1.78 *11*.
949	1548.6	(11+)	599.1	(9+)	Q	Mult.: γ anisotropy ratio=1.77 *9*.
988	2536.6	(13+)	1548.6	(11+)	Q	Mult.: γ anisotropy ratio=1.81 *9*.
1034	5752.7	(19−)	4718.7	(17−)		Mult.: γ anisotropy ratio=1.49 *6* for 1034γ+1036γ doublet.
1036	1270.9	(10+)	235	(8+)		Mult.: γ anisotropy ratio=1.49 *6* for 1034γ+1036γ doublet.
1105	5418.6	(19+)	4313.6	(17+)	Q	Mult.: γ anisotropy ratio=1.62 *14*.
1117	4313.6	(17+)	3196.6	(15+)	Q	Mult.: γ anisotropy ratio=1.35 *7*.
1419	7172	(21−)	5752.7	(19−)	Q	Mult.: γ anisotropy ratio=1.88 *24*.

† Uncertainty unstated by authors.
‡ Based on γ anisotropy ratio (as read by the evaluator from plot of measured γ anisotropy versus Eγ in fig. 1 of 1997Ka07) and given in comments on the relevant gammas; expected values are≈1.7 for ΔJ=0 or 2 transitions, <1 for ΔJ=1 transitions.
# Placement of transition in the level scheme is uncertain.

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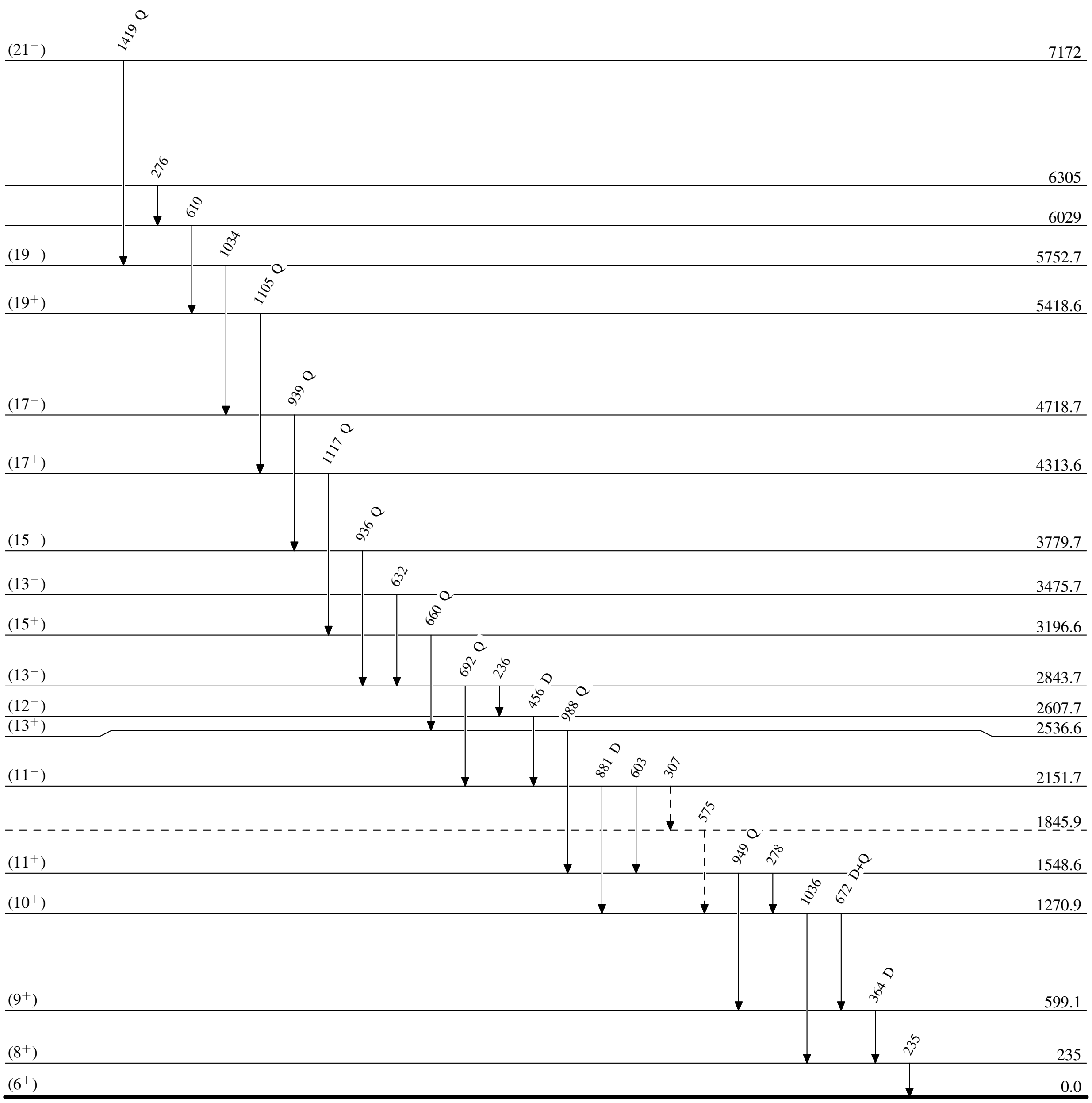
Level Scheme

Legend

- - - - - ► γ Decay (Uncertain)



$^{92}_{45}Rh_{47}$

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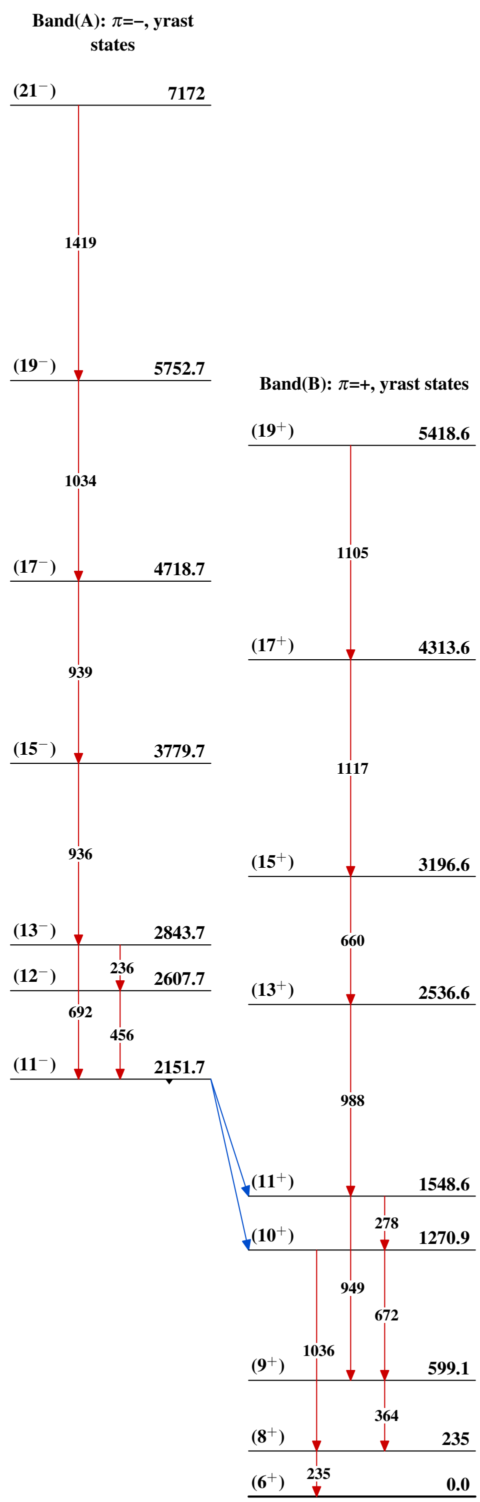

$^{92}_{45}Rh_{47}$