^{175}Lu(n,n′γ) 2004Ga04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 102, 719 (2004)	1-Jun-2004

Target: $^{nat}Lu_2O_3$ (with a natural abundance of 97.4% of ^{175}Lu). Projectile: <1 MeV *800*00 MeV neutrons from spallation using 800 MeV protons on ^{nat}W target (pulsed proton beam of 1.8 μs spacing for 625 μs macropulses at a macropulse rate 80 Hz). Detector: GEANIE spectrometer consisted of eleven planar and fifteen 25% HPGe coaxial detectors. All planer and 9 HPGe detectors equipped with suppression shields. The planar detectors were placed at the most forward and backward angles, and HPGe detectors around 90±40° with respect to the beam direction. Measured: Eγ, Iγ, prompt γγ coin, delayed γγ coin, $T_{1/2}$.

^{175}Lu Levels

The 1391 keV three-quasiparticle state was excited and measured $T_{1/2}$=984 μs *13*(stat) 30 (sys) from 797γ single spectrum during the out-of-beam period gated on the event times 3.375<t_γ>6.575 after a macropulse subtraction from a spectrum gated on the event times 0.175<t_γ>3.375.

E(level)[†]	Jπ[‡]	Comments
0.0[#]	7/2+	
113.8[#] *7*	9/2+	
251.5[#] *7*	11/2+	
343.3[@] *7*	5/2+	
353.3[b] *8*	5/2−	
370.7[b] *10*	1/2−	
396.3[c] *7*	9/2−	
415.1[b] *11*	9/2−	
432.7[@] *7*	7/2+	
514.5[b] *11*	3/2−	
529.4[c] *10*	11/2−	
546.6[@] *9*	9/2+	
562.6[b] *13*	13/2−	
626.2[a] *11*	1/2+	
632.5[a] *8*	3/2+	
672.7[b] *11*	7/2−	
684.2[@] *10*	11/2+	
685.5[c] *11*	13/2−	
757.0[a] *9*	5/2+	
773.0[a] *8*	7/2+	
798.3[b] *15*	17/2−	
845.1[@] *11*	13/2+	
864.2[c] *12*	15/2−	
886.1[b] *12*	11/2−	
989.7[a] *10*	9/2+	
1005.2[d] *13*	7/2−	Jπ: From a good rotational model fit for an I(I+1) sequence with K=7/2, assuming the established levels at 9/2− to 13/2− from a rotational band and the 1005.2 keV level as a bandhead.
1018.9[a] *12*	11/2+	
1028.2[@] *12*	15/2+	
1064.6[c] *13*	17/2−	
1112.3[d] *11*	9/2−	
1121.7[b] *18*	21/2−	

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^{175}Lu(n,n′γ) 2004Ga04 (continued)

^{175}Lu Levels (continued)

E(level)†	Jπ‡	Comments
1149.9& *11*	3/2+	
1167.4b *14*	15/2−	
1218.4& *11*	5/2+	
1233.2?@	(17/2+)	
1242.4d *12*	11/2−	
1285.5c *14*	19/2−	
1311.2& *13*	7/2+	Jπ: From the 538.2γ decay pattern to the 7/2+ level at 773.0 of 1/2[411] band and the good agreement with the level energies predicted based on a rotational parameter 13.6 keV extracted from the 5/2+ to 3/2+ energy difference.
1316.8a *12*	13/2+	
1363.1a *15*	15/2+	
1394.6d *16*	13/2−	
1434.1& *14*	9/2+	Jπ: From the 444.4γ decay pattern to the 9/2+ level at 989.7 of 1/2[411] band and the good agreement with the level energies predicted based on a rotational parameter 13.6 keV extracted from the 5/2+ to 3/2+ energy difference.
1527.3c *17*	21/2−	
1573.4& *15*	11/2+	Jπ: From the 554.5γ decay pattern to the 11/2+ level at 1018.9 of 1/2[411] band and the good agreement with the level energies predicted energy based on a rotational parameter 13.6 keV extracted from the 5/2+ to 3/2+ energy difference.

† Deduced by evaluator from a least-squares fit to the γ-ray energies assuming ΔE=1 keV.
‡ From adopted level and M1/E2 in-band transitions.
# 7/2(404) band.
@ 5/2(402) band.
& 3/2(411) band.
a 1/2(411) band.
b 1/2(541) band.
c 9/2(514) band.
d 7/2(523) band.

γ(^{175}Lu)

Ei(level)	Jiπ	Eγ	Iγ†	Ef	Jfπ	Ei(level)	Jiπ	Eγ	Iγ†	Ef	Jfπ
113.8	9/2+	113.8		0.0	7/2+	529.4	11/2−	133.0		396.3	9/2−
251.5	11/2+	137.7		113.8	9/2+	546.6	9/2+	113.9		432.7	7/2+
		251.5		0.0	7/2+			203.4		343.3	5/2+
343.3	5/2+	343.3		0.0	7/2+	562.6	13/2−	147.4		415.1	9/2−
353.3	5/2−	353.3		0.0	7/2+	626.2	1/2+	255.6		370.7	1/2−
370.7	1/2−	17‡		353.3	5/2−	632.5	3/2+	261.8	23 *3*	370.7	1/2−
396.3	9/2−	144.9		251.5	11/2+			279.1	38 *4*	353.3	5/2−
		282.5		113.8	9/2+			289.2	100	343.3	5/2+
		396.3		0.0	7/2+	672.7	7/2−	257.8	94 *11*	415.1	9/2−
415.1	9/2−	62		353.3	5/2−			319.1	100	353.3	5/2−
432.7	7/2+	89.3		343.3	5/2+	684.2	11/2+	137.6		546.6	9/2+
		432.7		0.0	7/2+			251.5		432.7	7/2+
514.5	3/2−	143.8	35 *6*	370.7	1/2−	685.5	13/2−	156.1	100	529.4	11/2−
		161.2	100	353.3	5/2−			289.1	15 *2*	396.3	9/2−

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^{175}Lu(n,n′γ) 2004Ga04 (continued)

γ(^{175}Lu) (continued)

E_i(level)	J_i^π	E_γ	I_γ †	E_f	J_f^π	Comments
757.0	5/2+	124.6	100	632.5	3/2+	
		130.9	15 *3*	626.2	1/2+	
		413.7	13 *2*	343.3	5/2+	E_γ: In table 1 (2004Ga04), γ is presented as depopulating the 7/2+ level at 773.0 keV. This seems to be a typo. In the decay scheme 413.7γ is shown depopulating the 5/2+ state at 757.1 keV.
773.0	7/2+	140.5	100	632.5	3/2+	
		226.4	19 *3*	546.6	9/2+	
		340.4	46 *6*	432.7	7/2+	
		420.1	28 *4*	353.3	5/2−	
798.3	17/2−	235.7		562.6	13/2−	
845.1	13/2+	160.9		684.2	11/2+	
		298.5		546.6	9/2+	
864.2	15/2−	178.8	100	685.5	13/2−	
		334.8	33 *4*	529.4	11/2−	
886.1	11/2−	213.5	17 *3*	672.7	7/2−	
		323.4	92 *12*	562.6	13/2−	
		471.1	100	415.1	9/2−	
989.7	9/2+	216.6	100	773.0	7/2+	
		232.7	70 *9*	757.0	5/2+	
1005.2	7/2−	608.9		396.3	9/2−	
		1005.3‡		0.0	7/2+	
1018.9	11/2+	245.8		773.0	7/2+	
1028.2	15/2+	183.1		845.1	13/2+	
		343.9		684.2	11/2+	
1064.6	17/2−	200.4	100	864.2	15/2−	
		379.1	41 *6*	685.5	13/2−	
1112.3	9/2−	582.8	100	529.4	11/2−	
		716.1	27 *5*	396.3	9/2−	
1121.7	21/2−	323.4		798.3	17/2−	
1149.9	3/2+	517.5	100	632.5	3/2+	
		523.7	93 *14*	626.2	1/2+	
1167.4	15/2−	281.3		886.1	11/2−	
		369.1		798.3	17/2−	
		604.8		562.6	13/2−	
1218.4	5/2+	461.5	87 *13*	757.0	5/2+	
		585.9	100	632.5	3/2+	
1233.2?	(17/2+)	204.9‡		1028.2	15/2+	
		388.0‡		845.1	13/2+	
1242.4	11/2−	556.8	100	685.5	13/2−	
		713.1	69 *12*	529.4	11/2−	
1285.5	19/2−	220.9	100	1064.6	17/2−	
		421.3	117 *22*	864.2	15/2−	
1311.2	7/2+	538.2		773.0	7/2+	
1316.8	13/2+	297.9	50 *8*	1018.9	11/2+	
		327.2	100	989.7	9/2+	
1363.1	15/2+	344.2		1018.9	11/2+	
1394.6	13/2−	530.4		864.2	15/2−	
1434.1	9/2+	444.4		989.7	9/2+	
1527.3	21/2−	241.8		1285.5	19/2−	
1573.4	11/2+	554.5		1018.9	11/2+	

† Only for levels where new branching-ratio information could be obtained (2004Ga04).

‡ Placement of transition in the level scheme is uncertain.

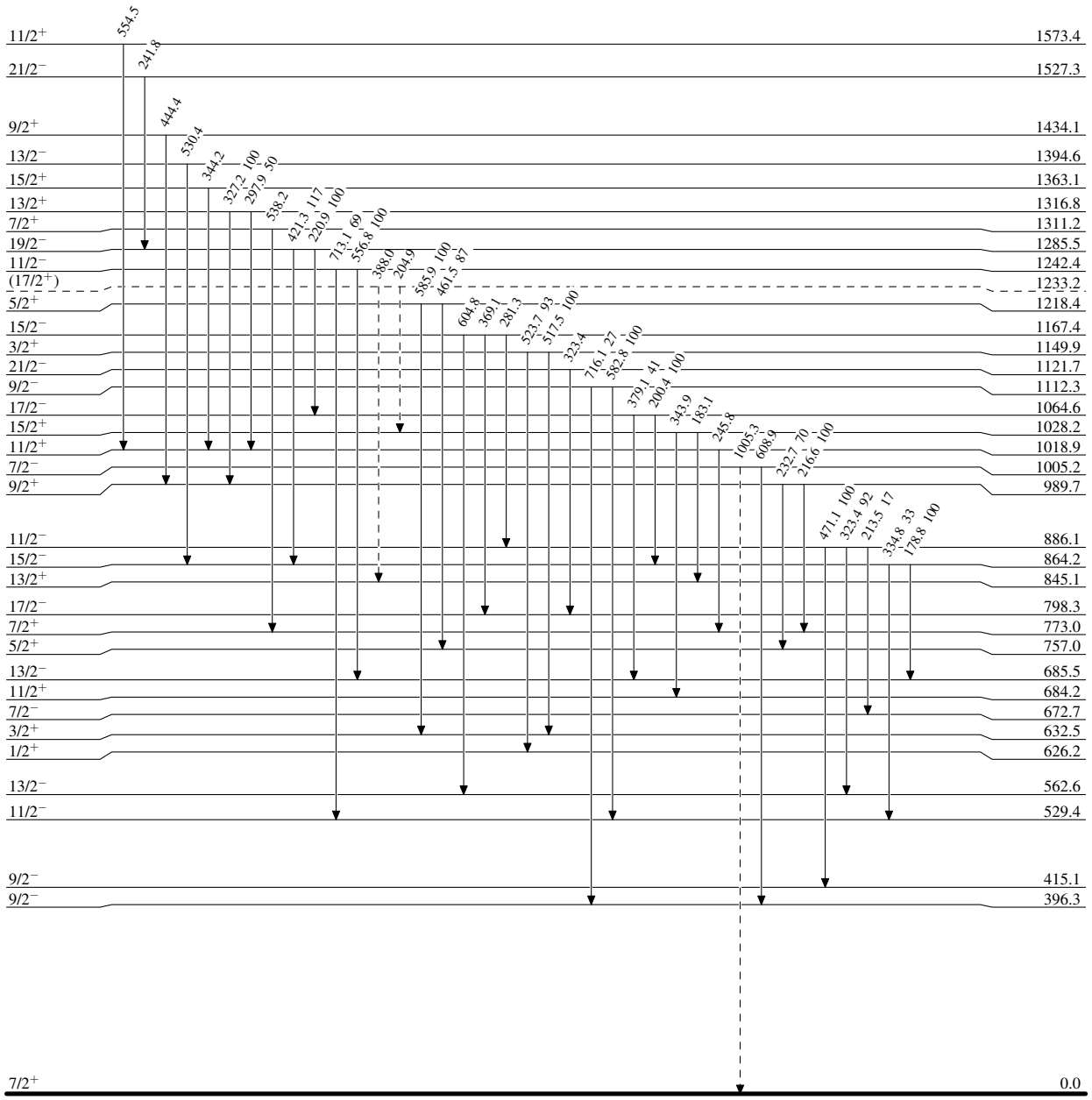
^{175}Lu(n,n′γ) **2004Ga04**

Legend

Level Scheme

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{175}_{71}Lu_{104}$

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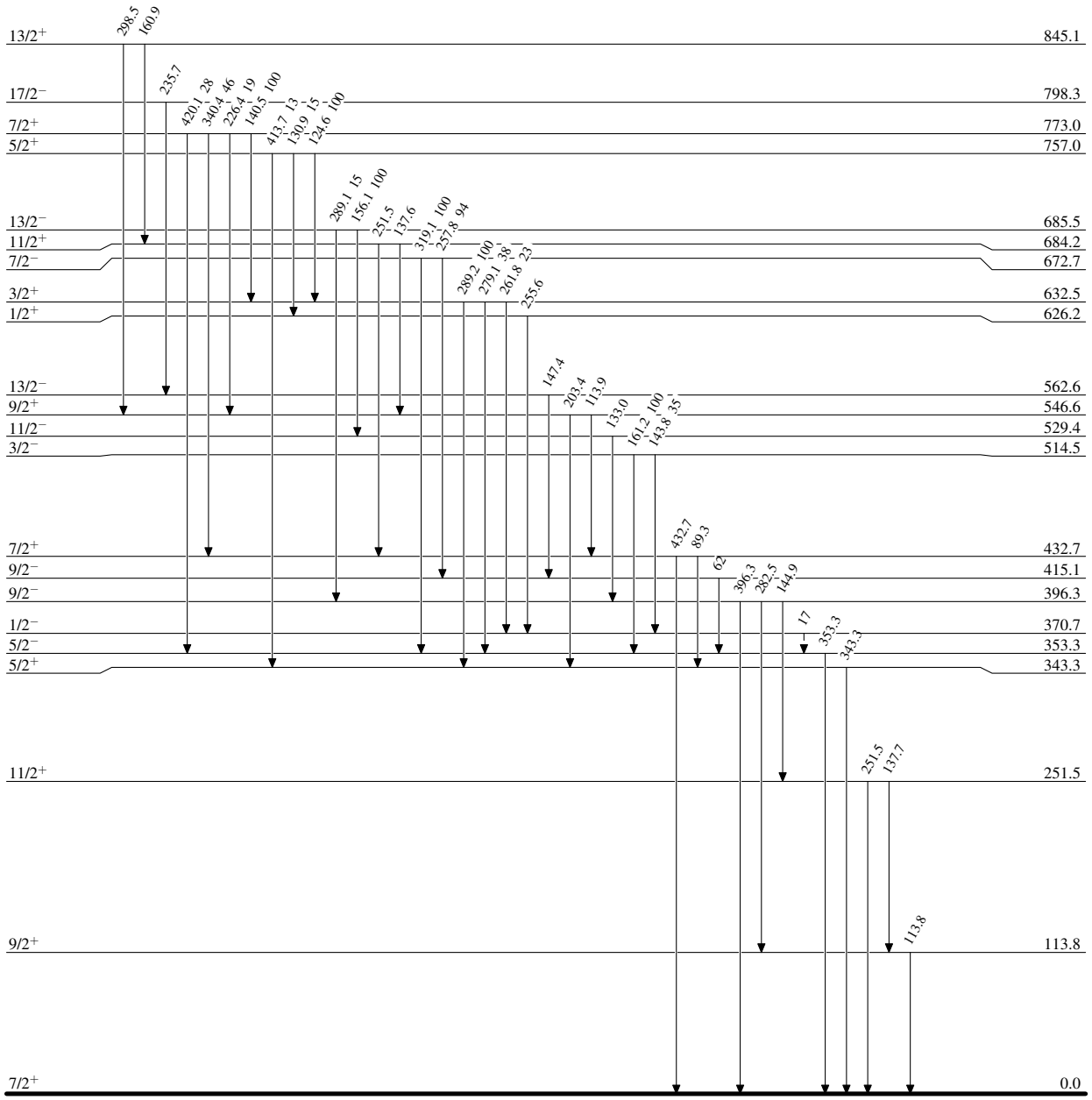
Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

– – – – – – ► γ Decay (Uncertain)



$^{175}_{71}Lu_{104}$