Inelastic scattering 2000BuZY

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. Browne	NDS 107, 2579 (2006)	1-Nov-2004

^{232}Th(^{86}Kr,^{86}Kr′) E=511 MeV; ^{232}Th(^{56}Fe,^{56}Fe′) E=362 MeV. Measured Eγ, Iγ, γ(θ). Deduced γ-ray multipolarities, level Jπ (2000BuZY).

^{232}Th(e,e′F) E(e)=7-65 MeV. Angular distribution following dipole absorption measured (1979As02).

^{232}Th(n,n′) E(n)=3.4 MeV. Optical-model parameters deduced. g.s. band through 6^+ level excited; β(2)=0.190, β(4)=0.071 deformations deduced (1978HaYS). E(n)=950-2100 keV; FWHM≤15 keV. Cross sections for (n,n′) compared to (n,n′γ). See (n,n′γ) for results pertaining to excited states in ^{232}Th (1985Ci05).

^{232}Th(d,d′) E(d)=18-23 MeV polarized deuterons. g.s. band 0^+ through 6^+ level excited; Q=−2.4 *4*, moment E4=−3.0 *8* deduced prolate-rotor model (1982Cl01,1982Cl03).

^{232}Th(^{3}He,^{3}He′) E(^{3}He)=108.5 MeV. Scattering at small angles measured, giant-monopole resonance studied. E(monopole)=13.35 MeV *4* Γ(res)=2.3 MeV *4*, 72% of energy weighted sum-rule observed (1980Bu16).

^{232}Th(p,p′) E(p)=35 MeV. Magnetic spectrograph, FWHM=15 keV, angular distribution. g.s. band through 10^+ level observed, higher states excitation pattern similar to (d,d′). Deformed optical-model potential used, deformation parameters deduced: β(2)=0.202 *2*, β(4)=0.068 *1*, β(6)=0.009 *2* (1979Ki14,1981Ro09).

^{232}Th(p,p′) polarized protons E(p)=65 MeV. σ(θ), analyzing power measured for g.s. band through 6^+ level. Multipole moments of the deformed optical potential deduced (1986Ta12).

^{232}Th(p,p′), E=20-65 MeV, deduced deformation parameter (20004Su12).

^{232}Th(α,α′) E(α)=50 MeV. Magnetic spectrograph, angular distribution. g.s. band through 8^+ level measured. Coupled-channels analysis, deformation parameters deduced: β(2)=0.183 *11*, β(4)=0.049 *6* (1976Da17), β(6) is negative (1979Es06).

^{232}Th(^{17}O,^{17}O′), E=1435 MeV, measured cross-section of fission fragments (1994Ca02).

^{232}Th(^{17}O,^{17}O′), E=3360 MeV (1990CaZX).

^{232}Th Levels

E(level)†	Jπ†	E(level)†	Jπ†	E(level)†	Jπ†	E(level)†	Jπ†
0‡	0^+	883.6#	5^-	2101.7#	15^-	3619.6‡	24^+
49.4‡	2^+	1042.9#	7^-	2262.9‡	18^+	4050.2#	25^-
162.1‡	4^+	1137.1‡	12^+	2445.4#	17^-	4116.2‡	26^+
333.2‡	6^+	1249.6#	9^-	2691.5‡	20^+	4506#	(27^-)
556.9‡	8^+	1482.8‡	14^+	2813.2#	19^-	4631.8‡	(28^+)
714.2#	1^-	1498.8#	11^-	3144.2‡	22^+	5162‡	(30^+)
774.4#	3^-	1784.8#	13^-	3203.8#	21^-		
827.0‡	10^+	1858.6‡	16^+	3616.4#	23^-		

† From 2000BuZY.
‡ Band(A): $K^\pi=0^+$ g.s. rotational band.
# Band(B): $K^\pi=0^-$ rotational band.

γ(^{232}Th)

Eγ†	Ei(level)	Jiπ	Ef	Jfπ	Mult.‡	Eγ†	Ei(level)	Jiπ	Ef	Jfπ	Mult.‡
49.4	49.4	2^+	0	0^+	E2	243.1	2101.7	15^-	1858.6	16^+	
112.7	162.1	4^+	49.4	2^+	E2	249.0	1498.8	11^-	1249.6	9^-	E2
159.2	1042.9	7^-	883.6	5^-	E2	269.8	827.0	10^+	556.9	8^+	E2
171.1	333.2	6^+	162.1	4^+	E2	285.9	1784.8	13^-	1498.8	11^-	E2
206.8	1249.6	9^-	1042.9	7^-	E2	302.5	1784.8	13^-	1482.8	14^+	
223.7	556.9	8^+	333.2	6^+	E2	310.2	1137.1	12^+	827.0	10^+	E2

Continued on next page (footnotes at end of table)

Inelastic scattering 2000BuZY (continued)

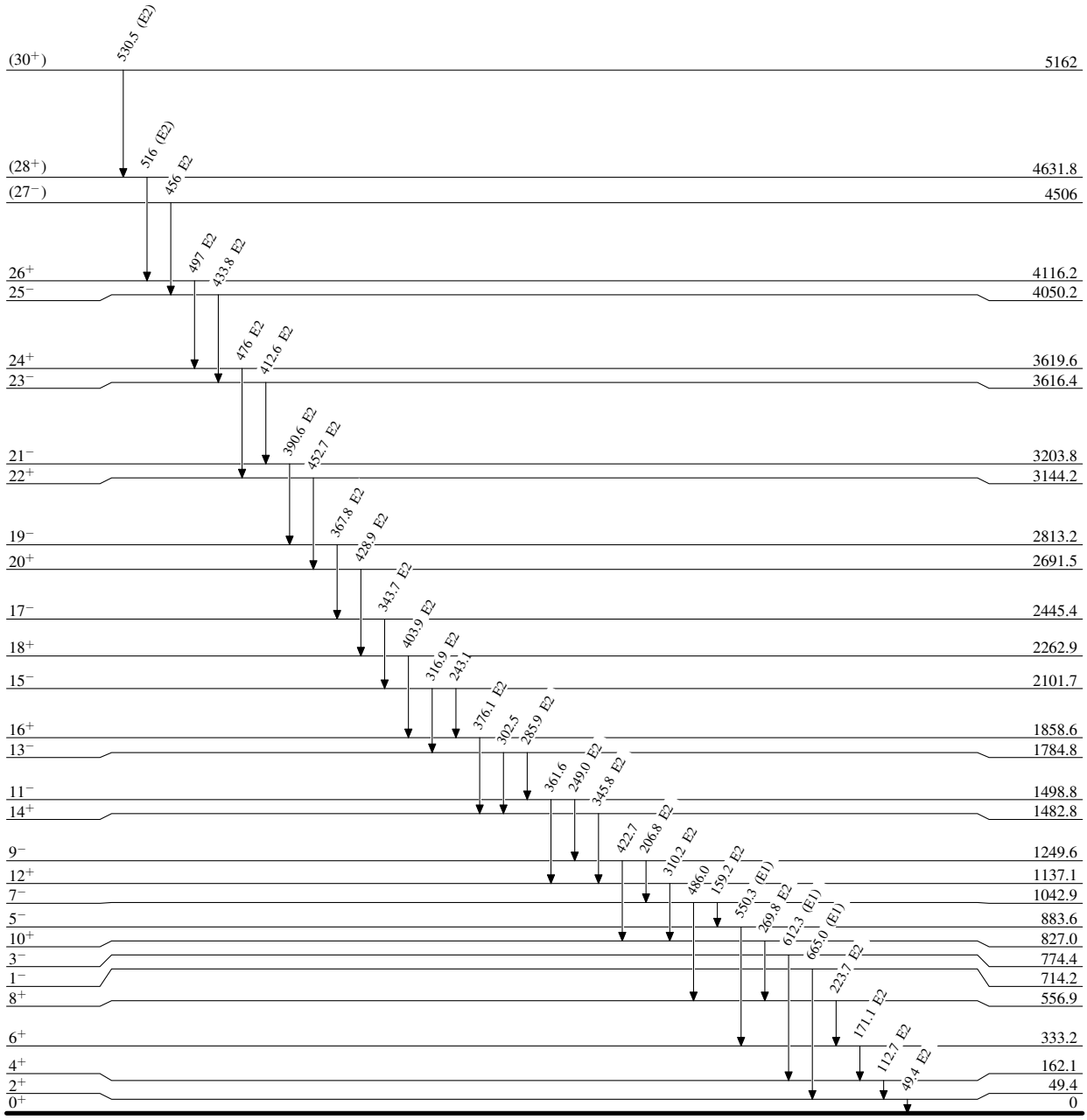
$\gamma(^{232}Th)$ (continued)

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]
316.9	2101.7	15^-	1784.8	13^-	E2	433.8	4050.2	25^-	3616.4	23^-	E2
343.7	2445.4	17^-	2101.7	15^-	E2	452.7	3144.2	22^+	2691.5	20^+	E2
345.8	1482.8	14^+	1137.1	12^+	E2	456	4506	(27^-)	4050.2	25^-	E2
361.6	1498.8	11^-	1137.1	12^+		476	3619.6	24^+	3144.2	22^+	E2
367.8	2813.2	19^-	2445.4	17^-	E2	486.0	1042.9	7^-	556.9	8^+	
376.1	1858.6	16^+	1482.8	14^+	E2	497	4116.2	26^+	3619.6	24^+	E2
390.6	3203.8	21^-	2813.2	19^-	E2	516	4631.8	(28^+)	4116.2	26^+	(E2)
403.9	2262.9	18^+	1858.6	16^+	E2	530.5	5162	(30^+)	4631.8	(28^+)	(E2)
412.6	3616.4	23^-	3203.8	21^-	E2	550.3	883.6	5^-	333.2	6^+	(E1)
422.7	1249.6	9^-	827.0	10^+		612.3	774.4	3^-	162.1	4^+	(E1)
428.9	2691.5	20^+	2262.9	18^+	E2	665.0	714.2	1^-	49.4	2^+	(E1)

[†] From 2000BuZY.
[‡] From Adopted Gammas; mostly from $\gamma(\theta)$ in Coulomb Excitation.

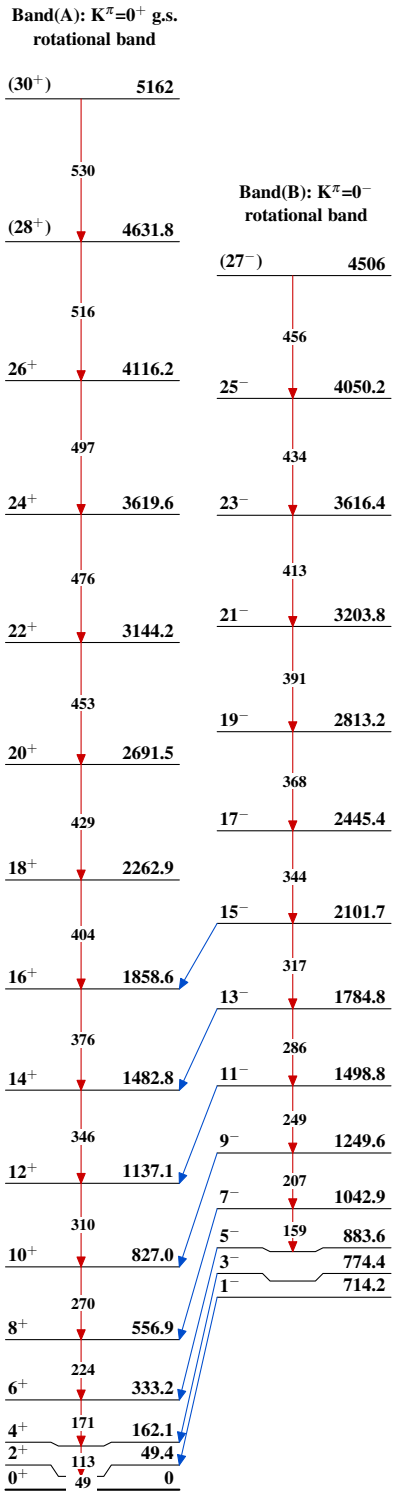
Inelastic scattering 2000BuZY

Level Scheme



$^{232}_{90}Th_{142}$

Inelastic scattering 2000BuZY



$^{232}_{90}Th_{142}$