Coulomb excitation 2005Zh20,1957Ne07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 122, 293 (2014)	30-Jun-2013

Additional information 1.

2005Zh20: ^{207}Pb beam, E=1300 MeV. Measured Eγ, Iγ, γγ, γγ(θ)(DCO) with the Gammasphere array of 101 Compton-suppressed HPGe detectors.

1993De12: 99.967% enriched ^{239}Pu target. Projectile: ^{117}Sn, E=42.9 MeV. Measured Eγ, γγ coin. Detector: Spin Spectrometer, an array of 45 NaI detectors and 18 BGO or NaI shielded, Compton-suppressed Ge detectors. Other: 1995Cr01.

1990StZZ: ^{239}Pu target. Projectile: ^{90}Zr, E=500 MeV. Measured Eγ, γγ coin. Detector: Ge(Li) array.

1957Ne07: ^{239}Pu target. Projectile: Alpha particles, E=2.85 MeV. Measured Eγ, Iγ. Detector: proportional counter.

^{239}Pu Levels

E(level)†	Jπ	Comments
0.0#	1/2+	
7.861‡@ 2	3/2+	Additional information 2.
57.275‡# 2	5/2+	Additional information 3. B(E2)=5.3 3 (1957Ne07) using α=214.
75.705‡@ 3	7/2+	Additional information 4.
163.76‡# 3	9/2+	Additional information 5.
193.5@ 8	11/2+	
318.5# 7	13/2+	
359.2@ 9	15/2+	
469.8&	(1/2−)	
492.1a	(3/2−)	
505.6&	(5/2−)	
519.5# 9	17/2+	
556.0a 7	(7/2−)	
570.9@ 10	19/2+	
583&	(9/2−)	
661.2a 8	11/2−	
698.7& 10	13/2−	
764.7# 10	21/2+	
806.4a 9	15/2−	
828.0@ 11	23/2+	
857.5& 10	17/2−	
992.5a 10	19/2−	
1053.1# 11	25/2+	
1058.1& 11	21/2−	
1127.8@ 13	27/2+	
1219.4a 11	23/2−	
1300.9& 12	25/2−	
1381.5# 13	29/2+	
1467.8@ 14	31/2+	
1487.4a 15	27/2−	
1584.9& 14	29/2−	
1748.5# 14	33/2+	
1795.4a 18	31/2−	

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Coulomb excitation 2005Zh20,1957Ne07 (continued)

^{239}Pu Levels (continued)

E(level)[†]	Jπ	E(level)[†]	Jπ	E(level)[†]	Jπ	E(level)[†]	Jπ
1847.0[@] *15*	35/2+	2529.4[a] *23*	39/2−	3108.0[&] *20*	45/2−	3895[a] *3*	51/2−
1908.9[&] *15*	33/2−	2590.1[#] *17*	41/2+	3198.0[@] *22*	47/2+	4080.0[&] *24*	(53/2−)
2143.4[a] *21*	35/2−	2672.0[&] *17*	41/2−	3407[a] *3*	47/2−	4087.1[#] *24*	(53/2+)
2152.2[#] *16*	37/2+	2714.0[@] *19*	43/2+	3559.1[#] *22*	(49/2+)	4256[@] *3*	(55/2+)
2263.0[@] *16*	39/2+	2951.4[a] *25*	43/2−	3578.0[&] *22*	(49/2−)	4413[a] *3*	55/2−
2272.0[&] *16*	37/2−	3060.1[#] *20*	45/2+	3713.0[@] *24*	(51/2+)		

[†] Deduced by evaluators from least-squares fit to Eγ′s; ΔEγ=1 keV assumed for each transition, unless otherwise noted.
[‡] From ^{239}Pu in Adopted Gammas.
[#] Band(A): 1/2[631], α=+1/2.
[@] Band(a): 1/2[631], α=−1/2.
[&] Band(B): Octupole band, α=+1/2. Band associated with octupole vibration at low spin.
[a] Band(b): Octupole band, α=−1/2. Band associated with octupole vibration at low spin.

γ(^{239}Pu)

E_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]
7.860[†] *3*	7.861	3/2+	0.0	1/2+	
49.412[†] *4*	57.275	5/2+	7.861	3/2+	M1+E2[‡]
57.273[†] *4*	57.275	5/2+	0.0	1/2+	E2
67.841[†] *7*	75.705	7/2+	7.861	3/2+	E2
88.06[†] *3*	163.76	9/2+	75.705	7/2+	M1+E2[‡]
106.47[†] *4*	163.76	9/2+	57.275	5/2+	E2
118	193.5	11/2+	75.705	7/2+	E2[@]
125	318.5	13/2+	193.5	11/2+	
145	806.4	15/2−	661.2	11/2−	(E2)[a]
155	318.5	13/2+	163.76	9/2+	E2[@]
159	857.5	17/2−	698.7	13/2−	
160	519.5	17/2+	359.2	15/2+	
166[b]	359.2	15/2+	193.5	11/2+	E2[@]
166[b]	1219.4	23/2−	1053.1	25/2+	[&]
173	1300.9	25/2−	1127.8	27/2+	[&]
186	992.5	19/2−	806.4	15/2−	(E2)[a]
194	764.7	21/2+	570.9	19/2+	
201[b]	519.5	17/2+	318.5	13/2+	E2[@]
201[b]	1058.1	21/2−	857.5	17/2−	
212	570.9	19/2+	359.2	15/2+	E2[@]
225	1053.1	25/2+	828.0	23/2+	
227	1219.4	23/2−	992.5	19/2−	(E2)[a]
228	992.5	19/2−	764.7	21/2+	[&]
230	1058.1	21/2−	828.0	23/2+	[&]
243	1300.9	25/2−	1058.1	21/2−	(E2)[a]
245	764.7	21/2+	519.5	17/2+	E2[@]
254	1381.5	29/2+	1127.8	27/2+	
257	828.0	23/2+	570.9	19/2+	E2[@]

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Coulomb excitation 2005Zh20,1957Ne07 (continued)

$\gamma(^{239}Pu)$ (continued)

E_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]
268	1487.4	27/2$^-$	1219.4	23/2$^-$	(E2)[a]
281	1748.5	33/2$^+$	1467.8	31/2$^+$	
284	1584.9	29/2$^-$	1300.9	25/2$^-$	(E2)[a]
287[b]	806.4	15/2$^-$	519.5	17/2$^+$	&
287[b]	857.5	17/2$^-$	570.9	19/2$^+$	&
288	1053.1	25/2$^+$	764.7	21/2$^+$	@
300	1127.8	27/2$^+$	828.0	23/2$^+$	@
305	2152.2	37/2$^+$	1847.0	35/2$^+$	
308	1795.4	31/2$^-$	1487.4	27/2$^-$	(E2)[a]
324	1908.9	33/2$^-$	1584.9	29/2$^-$	(E2)[a]
327	2590.1	41/2$^+$	2263.0	39/2$^+$	
328	1381.5	29/2$^+$	1053.1	25/2$^+$	E2[@]
340[b]	698.7	13/2$^-$	359.2	15/2$^+$	&
340[b]	1467.8	31/2$^+$	1127.8	27/2$^+$	E2[@]
343	661.2	11/2$^-$	318.5	13/2$^+$	&
348	2143.4	35/2$^-$	1795.4	31/2$^-$	(E2)[a]
363	2272.0	37/2$^-$	1908.9	33/2$^-$	(E2)[a]
367	1748.5	33/2$^+$	1381.5	29/2$^+$	@
379	1847.0	35/2$^+$	1467.8	31/2$^+$	E2[@]
386	2529.4	39/2$^-$	2143.4	35/2$^-$	
392	556.0	(7/2$^-$)	163.76	9/2$^+$	&
400	2672.0	41/2$^-$	2272.0	37/2$^-$	
404	2152.2	37/2$^+$	1748.5	33/2$^+$	E2[@]
409	2672.0	41/2$^-$	2263.0	39/2$^+$	&
416	2263.0	39/2$^+$	1847.0	35/2$^+$	E2[@]
422	2951.4	43/2$^-$	2529.4	39/2$^-$	
425	2272.0	37/2$^-$	1847.0	35/2$^+$	&
436	3108.0	45/2$^-$	2672.0	41/2$^-$	
438	2590.1	41/2$^+$	2152.2	37/2$^+$	E2[@]
441	1908.9	33/2$^-$	1467.8	31/2$^+$	&
451	2714.0	43/2$^+$	2263.0	39/2$^+$	E2[@]
455	1219.4	23/2$^-$	764.7	21/2$^+$	&
456	3407	47/2$^-$	2951.4	43/2$^-$	
457	1584.9	29/2$^-$	1127.8	27/2$^+$	&
470[b]	3060.1	45/2$^+$	2590.1	41/2$^+$	E2[@]
470[b]	3578.0	(49/2$^-$)	3108.0	45/2$^-$	
473[b]	992.5	19/2$^-$	519.5	17/2$^+$	&
473[b]	1300.9	25/2$^-$	828.0	23/2$^+$	&
484	3198.0	47/2$^+$	2714.0	43/2$^+$	E2[@]
487	1058.1	21/2$^-$	570.9	19/2$^+$	&
488[b]	806.4	15/2$^-$	318.5	13/2$^+$	&
488[b]	3895	51/2$^-$	3407	47/2$^-$	
497	661.2	11/2$^-$	163.76	9/2$^+$	&
498	857.5	17/2$^-$	359.2	15/2$^+$	&
499[b]	556.0	(7/2$^-$)	57.275	5/2$^+$	&
499[b]	3559.1	(49/2$^+$)	3060.1	45/2$^+$	E2
502	4080.0	(53/2$^-$)	3578.0	(49/2$^-$)	
505	698.7	13/2$^-$	193.5	11/2$^+$	&
515	3713.0	(51/2$^+$)	3198.0	47/2$^+$	
518	4413	55/2$^-$	3895	51/2$^-$	
528	4087.1	(53/2$^+$)	3559.1	(49/2$^+$)	
543	4256	(55/2$^+$)	3713.0	(51/2$^+$)	

† From ^{239}Pu in Adopted Gammas.
‡ From Adopted Gammas.
# Additional information 6.
@ $\gamma\gamma(\theta)$ analysis supports stretched E2 transition (2005Zh02).
& Linking transition suggested by 2005Zh20 as E1.
[a] From γ-ray angular distributions (1993De12).
[b] Multiply placed.

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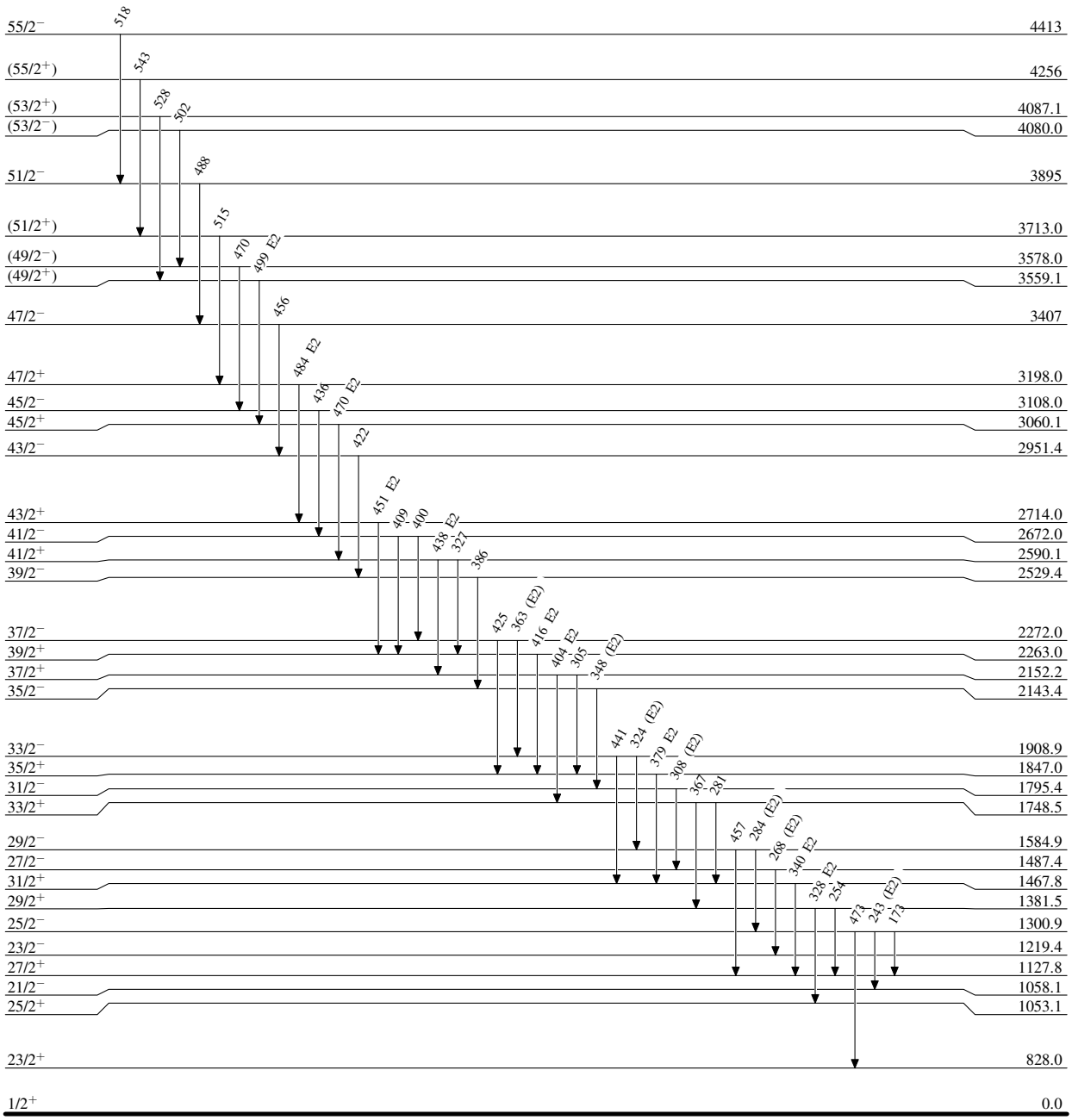
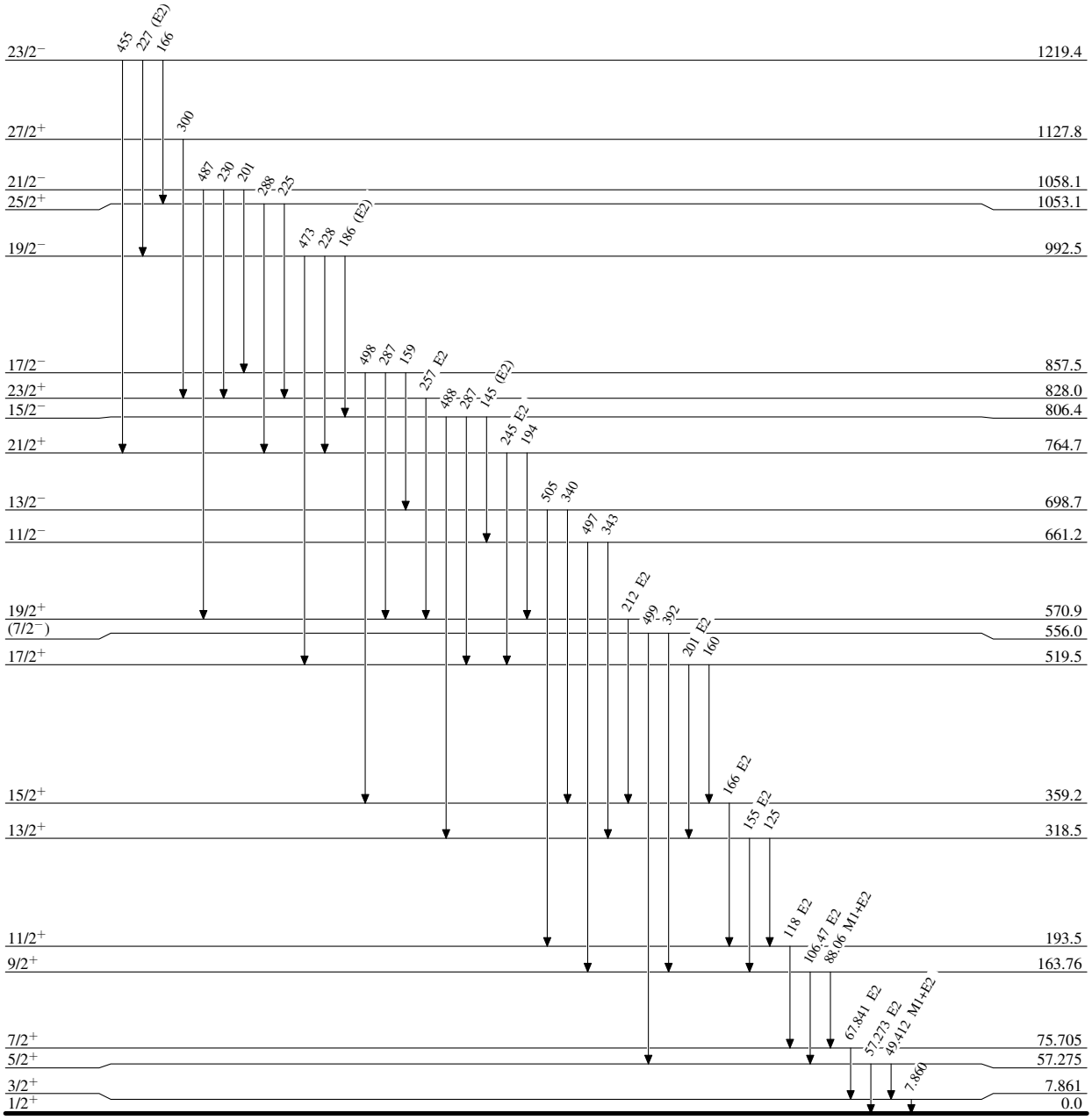
Level Scheme



$^{239}_{94}Pu_{145}$

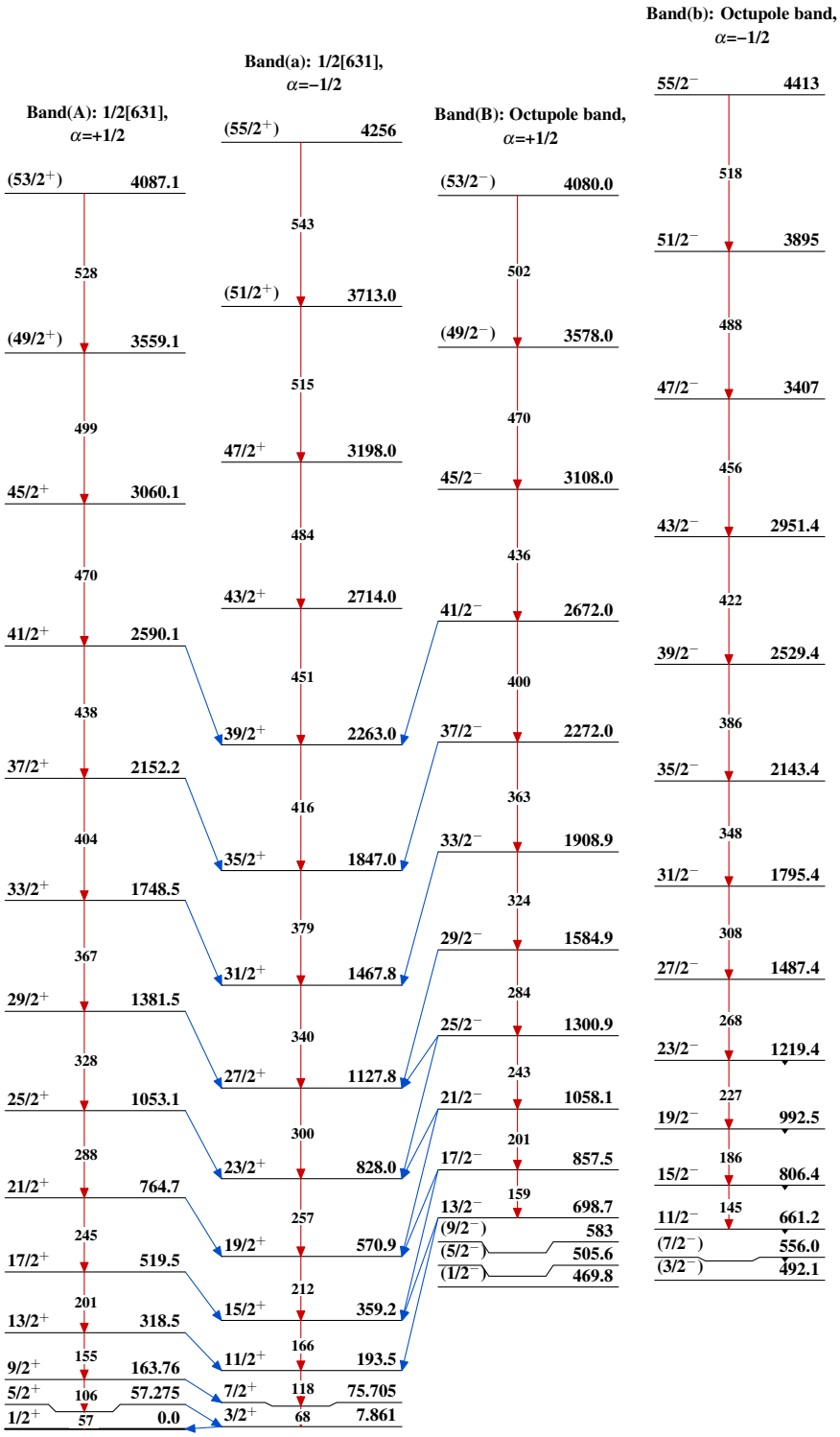
Coulomb excitation 2005Zh20,1957Ne07

Level Scheme (continued)



$^{239}_{94}Pu_{145}$

Coulomb excitation 2005Zh20,1957Ne07



$^{239}_{94}Pu_{145}$