^{150}Nd(α,4nγ) E=45 MeV 1977Su05,1976SuZY,1986UrZY

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, A. A. Sonzogni	NDS 114, 435 (2013)	1-Apr-2013

See also: 1987Ur01, 1987UrZY.

See similar data obtained by means of the ^{148}Nd(α,2n) reaction by 1975Th07.

1977Su05: singles γ-ray spectra were taken with a 110-cm^3 Ge(Li) detector (2.2-keV resolution at 1332 keV) placed at a distance of 20 cm from the target. $\gamma(\theta)$ were measured by taking data at six angles between 90° and 155°. x-ray spectra were taken with an intrinsic germanium detector with 500 eV resolution at 122 keV. Internal conversion electron spectra were measured with a mini-orange electron spectrometer. Results are discussed in terms of IBA theory.

^{150}Sm Levels

E(level)	J$^\pi$[#]	E(level)	J$^\pi$[#]	E(level)	J$^\pi$[#]	E(level)	J$^\pi$[#]
0.0[†]	0$^+$	2589.1[&] *8*	(8$^-$)	3941.0[&] *12*	(14$^-$)	5346.5[‡] *11*	19$^-$
333.9[†] *3*	2$^+$	2744.4[‡] *6*	11$^-$	4025.5[&] *9*	(14)	5581.4[&] *14*	(19)
773.5[†] *4*	4$^+$	2929.1 *6*	(10$^-$)	4306.0[†] *7*	16$^+$	5592.9[†&] *14*	(20$^+$)
1071.5?[‡] *4*	3$^-$	2996.0[&] *8*	11$^{(-)}$	4386.5[&] *8*	16$^{(+)}$	5739.8?[&] *16*	
1279.0[†] *5*	6$^+$	3048.5[†] *6*	12$^+$	4576.0[&] *13*	(16$^-$)	6021.5?[&] *19*	(20$^-$)
1358.0[‡] *5*	5$^-$	3293.6[‡] *6*	13$^-$	4605.9[‡] *10*	17$^-$	6065.4[&] *17*	
1449.1[@] *5*	4$^+$	3384.0 *7*	(12$^-$)	4612.3[&] *14*	(16)	6107.9?[‡&] *15*	(21)
1764.9[‡] *6*	7$^-$	3522.9[&] *10*	(12)	4929.3[†&] *9*	18$^+$	6421.5[&] *20*	
1837.1[†] *6*	8$^+$	3676.0[†] *7*	(14)$^+$	5045.8[†&] *13*	(18)		
2232.4[‡] *6*	9$^-$	3835.4[&] *8*	14$^{(+)}$	5251.3?[&] *17*			
2433.3[†] *6*	10$^+$	3914.4[‡] *7*	15$^-$	5276.5[&] *16*	(18$^-$)		

[†] Band(A): g.s. band.

[‡] Band(B): Negative parity band.

[#] Unambiguous J^π assignments were made possible in the g.s. band up to J^π=12$^+$, and the negative parity band up to J^π=11$^-$, by the presence of closed loops of interband E1 and intraband E2 transitions. J^π below 1500 keV are from Adopted Levels, except as noted.

[@] This level was placed in the decay scheme by 1977Su05 on basis of earlier work.

[&] From 1986UrZY.

γ(^{150}Sm)

Electron and γ-ray intensities were normalized through use of the theoretical values of the internal conversion coefficients for the pure E2 2$^+$ to 0$^+$ and 4$^+$ to 2$^+$ transitions.

Incomplete coincidence data given by authors.

ΔIγ: 1986UrZY do not report uncertainties. 1977Su05 have reported Iγ and ΔIγ for about half the known γ rays. The two papers are consistent with each other, the average difference between two values reported for a given γ ray being ± 2 units.

E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ[#]	Comments
190.1[@]	0.5	4025.5	(14)	3835.4	14$^{(+)}$			
200.6 *3*	3.3	2433.3	10$^+$	2232.4	9$^-$	D(+E2)[a]	+0.05 *20*	
238.3[@] *3*	1.1	3914.4	15$^-$	3676.0	(14)$^+$	D[a]		
244.7 *3*	4.2	3293.6	13$^-$	3048.5	12$^+$	D[a]		I_γ: intensity obtained from coincidence data.
251.6[@]	1.1	2996.0	11$^{(-)}$	2744.4	11$^-$			

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^{150}Nd(α,4nγ) E=45 MeV 1977Su05,1976SuZY,1986UrZY (continued)

γ(^{150}Sm) (continued)

Eγ	Iγ[†]	Ei(level)	$J^π_i$	Ef	$J^π_f$	Mult.[#]	δ[#]	Comments
303.9 3	2.2	3048.5	12+	2744.4	11−	D[a]		
311.3 3	17	2744.4	11−	2433.3	10+	D(+E2)[a]	≥−0.1	
323.4[@]	0.7	4929.3	18+	4605.9	17−	D[a]		
333.9 3	100	333.9	2+	0.0	0+	E2		α(K)exp=0.032 α(K)exp: Experimental value was normalized to theory. Mult.: this transition was taken to be pure E2 in order to normalize electron and γ-ray intensities.
335.9[@b]	0.5	3384.0	(12−)	3048.5	12+			
340.2[@]	2.4	2929.1	(10−)	2589.1	(8−)			
356.1[@]	1.1	6421.5		6065.4				
382.4[@]	0.7	3676.0	(14)+	3293.6	13−	D[a]		
395.1 3	24	2232.4	9−	1837.1	8+	E1(+M2)	+0.03 5	α(K)exp=0.0078 10
407.4[@]	0.3	1764.9	7−	1358.0	5−	E2[&]		
439.6 3	96	773.5	4+	333.9	2+	E2		α(K)exp=0.0148 α(K)exp: Experimental value was normalized to theory. Mult.: this transition was taken to be pure E2 in order to normalize electron and γ-ray intensities.
454.8 3	4.3	3384.0	(12−)	2929.1	(10−)			
467.5 3	4.3	2232.4	9−	1764.9	7−	E2		α(K)exp=0.014 4
472.2[@]	1.5	4386.5	16(+)	3914.4	15−	D[a]		
484.0[@]	1.3	6065.4		5581.4	(19)			
485.8 3	10	1764.9	7−	1279.0	6+	E1(+M2)	+0.05 +50−7	α(K)exp=0.0055 25
495.8 3	3.1	2929.1	(10−)	2433.3	10+	E1		α(K)exp<0.005
502.5[@]	1.8	4025.5	(14)	3522.9	(12)			
505.5 3	91	1279.0	6+	773.5	4+	E2		α(K)exp=0.0097 10
512.1 3	22	2744.4	11−	2232.4	9−	E2		α(K)exp=0.0075 20
541.8[@]	2.0	3835.4	14(+)	3293.6	13−	D[a]		
542.7[b]	0.3	4929.3	18+	4386.5	16(+)			
549.5 3	18	3293.6	13−	2744.4	11−	E2		α(K)exp=0.011 3
551.2[@]	1.0	4386.5	16(+)	3835.4	14(+)			
557.0[@]	2.5	3941.0	(14−)	3384.0	(12−)			
558.1 3	79	1837.1	8+	1279.0	6+	E2		α(K)exp=0.0077 12 Iγ: from 1977Su05.
562.8[@]	6.0	2996.0	11(−)	2433.3	10+			
584.5 3	3.5	1358.0	5−	773.5	4+	E1(+M2)	0.0 +3−1	α(K)exp<0.003
586.8[@]	1.3	4612.3	(16)	4025.5	(14)			
596.3 3	43	2433.3	10+	1837.1	8+	E2		α(K)exp=0.0074 12
615.1 3	20	3048.5	12+	2433.3	10+	E2		α(K)exp=0.0061 10
620.8 3	10	3914.4	15−	3293.6	13−	E2		α(K)exp=0.0055 12
623.3[@]	3.5	4929.3	18+	4306.0	16+	E2[&]		
627.5 3	11	3676.0	(14)+	3048.5	12+	E2		α(K)exp=0.0049 15
630.0 3	8.1	4306.0	16+	3676.0	(14)+	E2		α(K)exp=0.0056 20
635.0 3	1.6	4576.0	(16−)	3941.0	(14−)			Eγ: from 1977Su05.
639[@]	0.6	5251.3?		4612.3	(16)			
652.1[@]	1.4	5581.4	(19)	4929.3	18+			
659.3[@]	0.5	5045.8	(18)	4386.5	16(+)			
663.6[@]	2.2	5592.9	(20+)	4929.3	18+	E2[&]		

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^{150}Nd(α,4nγ) E=45 MeV 1977Su05,1976SuZY,1986UrZY (continued)

γ(^{150}Sm) (continued)

E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	Comments
675.6 *3*		1449.1	4^+	773.5	4^+		
691.6[@]	6.8	4605.9	17^-	3914.4	15^-	E2	α(K)exp=0.0035 *10* I_γ: intensity obtained from coincidence data.
694[@]	0.3	5739.8?		5045.8	(18)		
696.9[@]	1.5	2929.1	(10^-)	2232.4	9^-		α(K)exp<0.008
700.5[@]	0.8	5276.5	(18^-)	4576.0	(16^-)		
710.4[@]	1.7	4386.5	$16^{(+)}$	3676.0	$(14)^+$	E2[&]	
732.1[@b]	0.3	4025.5	(14)	3293.6	13^-		
737.6[@b] *3*	0.3	1071.5?	3^-	333.9	2^+		
740.6 *3*	3.1	5346.5	19^-	4605.9	17^-	E2[&]	α(K)exp<0.0035
745[@]	0.4	6021.5?	(20^-)	5276.5	(18^-)		
752.1[@]	2.8	2589.1	(8^-)	1837.1	8^+	M2	α(K)exp=0.018 *5* Mult.: from α(K)exp=0.018 *5* (1977Su05).
761.4[@]	0.5	6107.9?	(21)	5346.5	19^-	E2[&]	
763.5[@]	1.1	2996.0	$11^{(-)}$	2232.4	9^-		
778.4[@]	1.5	3522.9	(12)	2744.4	11^-		
786.8[@b]	0.4	3835.4	$14^{(+)}$	3048.5	12^+		
824.3[@]	0.6	2589.1	(8^-)	1764.9	7^-		

[†] Taken from 1986UrZY.
[‡] 1986UrZY do not report uncertainties. 1977Su05 have reported Iγ and ΔIγ for about half the known γ rays. The two papers are consistent with each other, the average difference between two values reported for a given γ ray being ± 2 units.
[#] Assignment made on basis of internal conversion and angular distribution data (1977Su05) and DCO ratios (1987Ur01). Below 1500 keV excitation, mult.′s of γ′s in decay scheme are also from adopted γ′s.
[@] From 1986UrZY. See also 1987Ur01.
[&] DCO ratio indicates stretched quadrupole transition (1987Ur01). For Eγ≤700, the authors rule out the possibility of Q=M2 based on RUL, with $T_{1/2}$ limits (not quoted) deduced from their experimental time resolution.
[a] DCO ratio indicates stretched dipole transition (1987Ur01).
[b] Placement of transition in the level scheme is uncertain.

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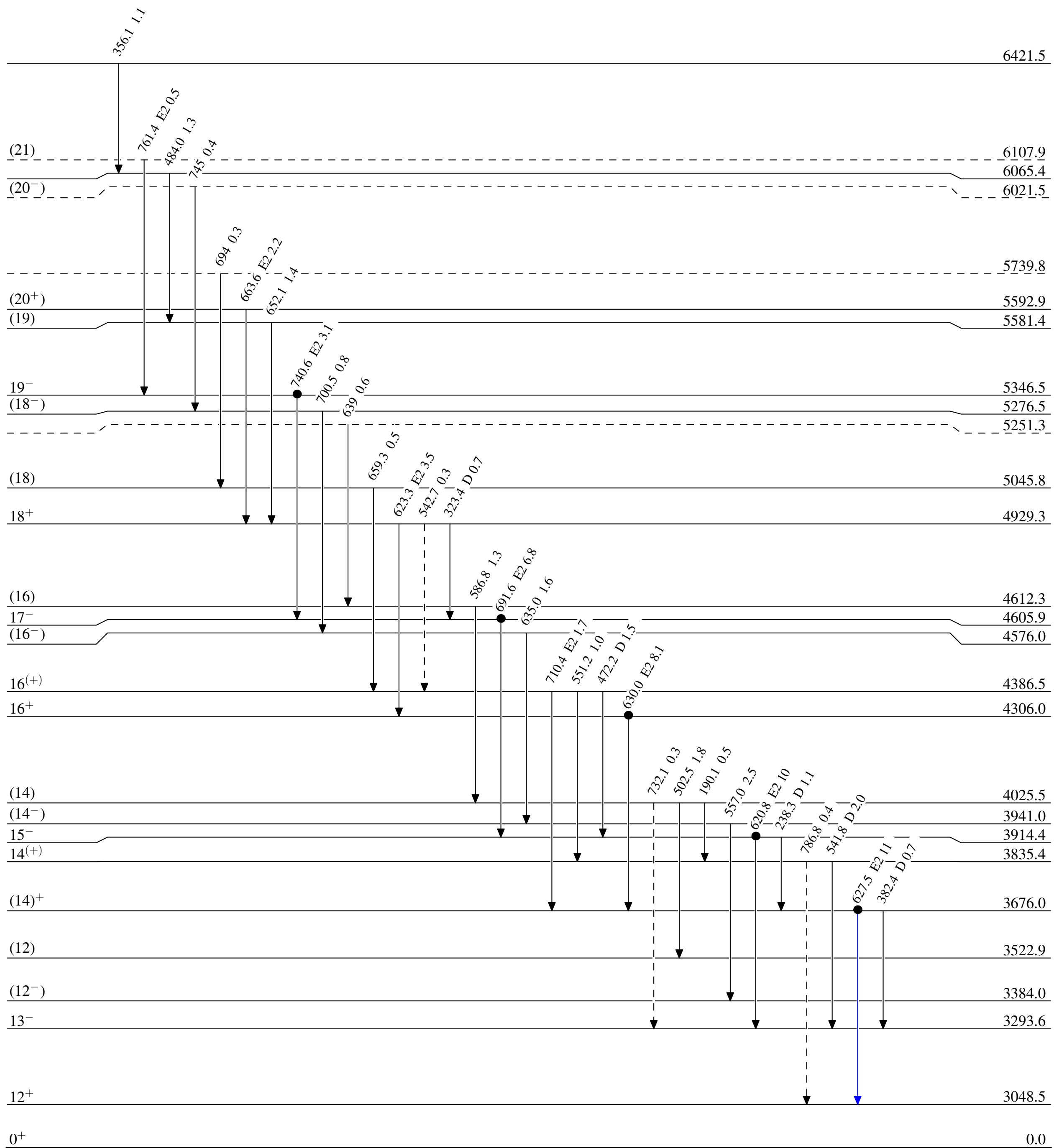
Level Scheme

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



$^{150}_{62}Sm_{88}$

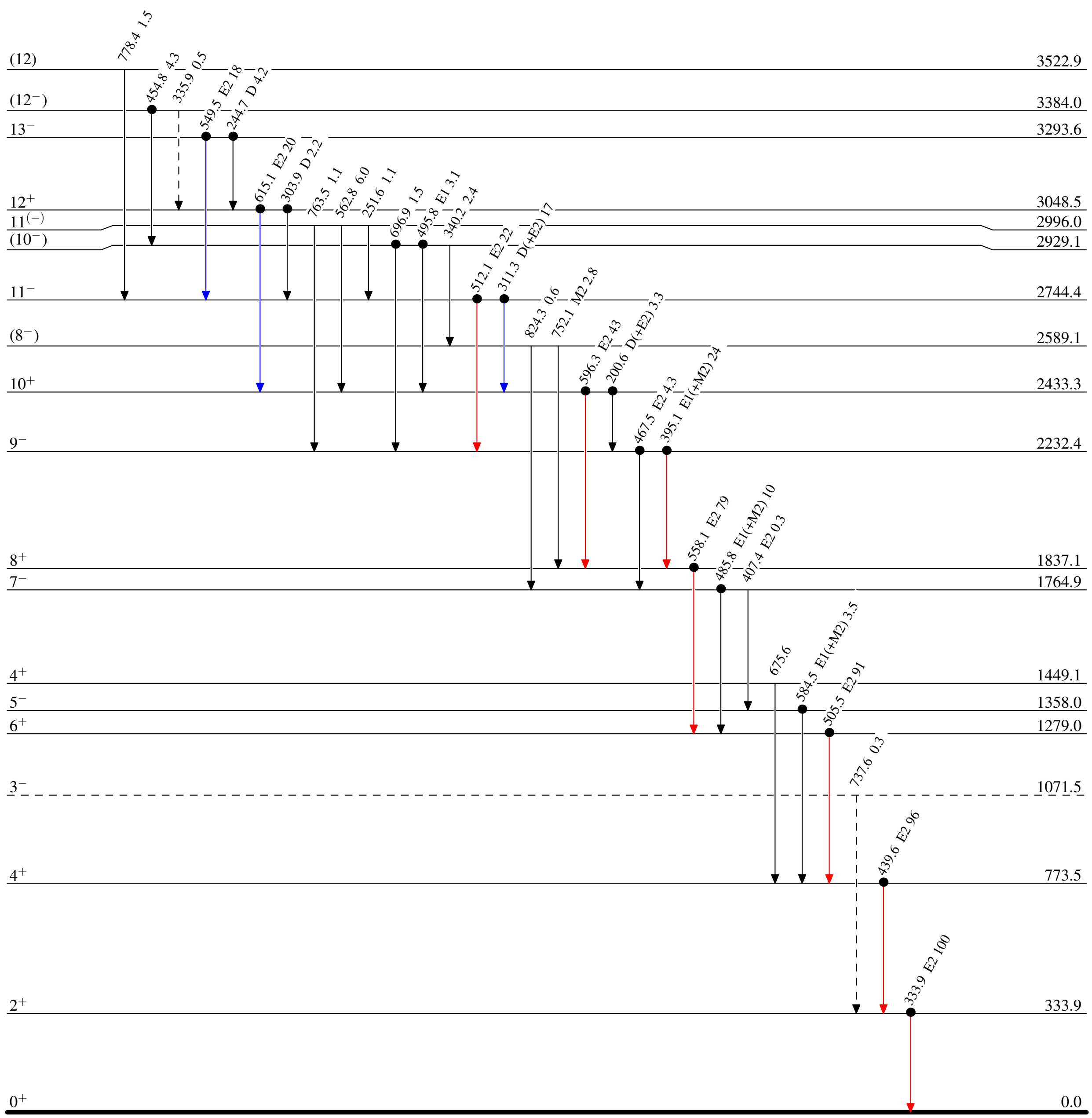
^{150}Nd(α,4nγ) E=45 MeV 1977Su05,1976SuZY,1986UrZY

Level Scheme (continued)

Intensities: Type not specified

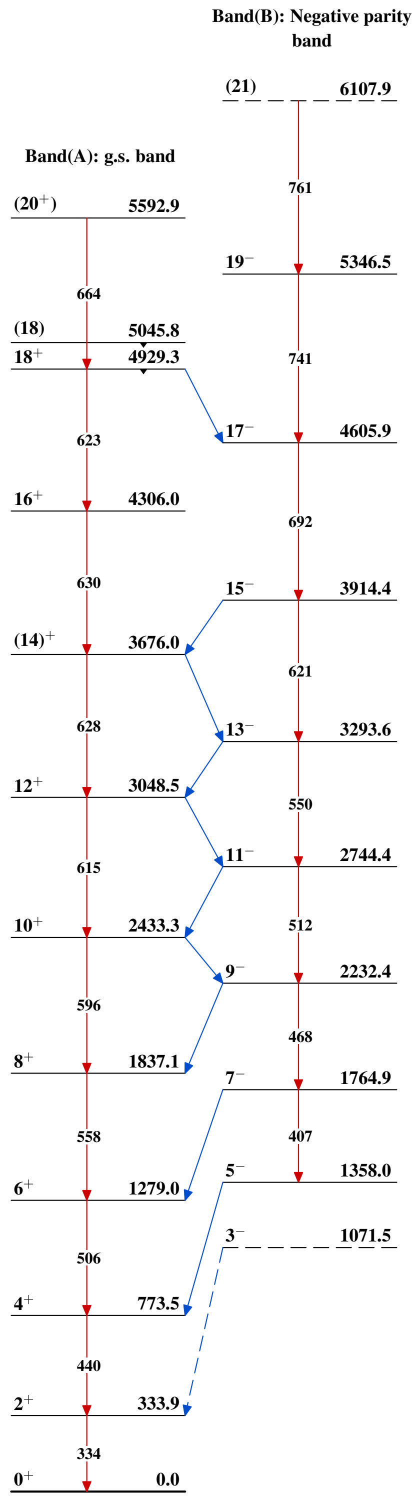
Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence



$^{150}_{62}Sm_{88}$

$^{150}Nd(\alpha,4n\gamma)$ E=45 MeV 1977Su05,1976SuZY,1986UrZY



$^{150}_{62}Sm_{88}$