

¹⁰⁸Pd(⁴⁸Ca,4nγ):SD

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 114, 1497 (2013)	31-Aug-2013

Includes ⁷⁴Ge(⁸²Se,4nγ); ⁷⁴Ge(⁸⁰Se,2nγ); ⁸²Se(⁷⁴Ge,4nγ); ¹¹⁰Pd(⁴⁸Ca,6nγ); ¹¹⁶Cd(⁴⁰Ar,4nγ); ¹²⁰Sn(³⁷Cl,p4nγ); (¹²⁰Sn(³⁶S,4nγ), ¹²²Sn(³⁴S,4nγ); ¹²⁴Sn(³³S,5nγ); ¹²⁴Sn(³⁴S,6nγ) reactions.

¹⁰⁸Pd(⁴⁸Ca,4nγ) references.

2007La20: E=191 MeV, measured the quasicontinuum of γ rays from the feeding and decay of super-deformed and normal bands.

2002La02, 2002La35: E=191 MeV, deduced connecting transitions from SD-1 band to normal bands.

1995Be20: E=200 MeV, γγγ, search for connecting transitions.

1994Da20: E=200 MeV, γ, γγ; SD bands.

1992Sm01: E=205 MeV, γ, γγ; SD band population.

1991Be12, 1987Be41: E=205 MeV, γ, γγ, γ(θ), γγ(t), Doppler shift.

1992AlZE, 1989AlZS: E=197 MeV, γ, γγ; decay out of SD-1 band.

1986Tw01: E=205 MeV, γ, γγ, γγ(E); SD band, decay out of band.

1985Tw01, 1984Ny01: E=210 MeV, γγ(E).

Others: 1995Ha43 ¹²⁴Sn(³³S,5nγ); 1992Mu10: E=160, 170 MeV, γ, γγ, (HI)γγ; SD band population. ¹²⁴Sn(³⁴S,6nγ) E=182 MeV: 1997Sm11, 1997St17, 1995Be65 ¹²³Sb(³⁷Cl,4nαγ): 2000Sc43 E=191 MeV, 1999Ai04: feeding pattern of SD band structures ¹²²Sn(³⁴S,4nγ): 1997Ni01: E=175 MeV. Measured Doppler shifts for gammas in SD-1 band, deduced Q(intrinsic) ¹²⁰Sn(³⁶S,4nγ): 1990Kh06: E=170 MeV, γγ; 1992Sm01: E=175 MeV, γ, γγ; SD band population; 1996Sa15: E=170 MeV, measured lifetimes with DSA method ¹²⁰Sn(³⁷Cl,p4nγ): 1993Ga10, 1993Ra08, (1992GaZS, 1992GaZX): E=187 MeV, γ, γγ, γγγ, DCO; possible hyperdeformed structure: 1993Ga10, 1995Vi02 (also 1997Vi03,1995Lu03,1997Lu11): E=187 MeV, pγγ. No evidence found for hyperdeformed structure by 1996TwZZ and 1997Sm11. ¹¹⁶Cd(⁴⁰Ar,4nγ): 1987De17: E=180 MeV, γ, γγ; SD band ¹¹⁰Pd(⁴⁸Ca,6nγ): 1995Ce08: E=220 MeV. Measured lifetimes, deduced Q(intrinsic) for SD-1 band. ⁸²Se(⁷⁴Ge,4nγ): 1987Ma54: E=4.6 MeV/nucleon, γγ; SD band ⁷⁴Ge(⁸⁰Se,2nγ) E=285 MeV, ⁷⁶Ge(⁸⁰Se,4nγ) E=320 MeV: 1987No06: γγ(t), Doppler shift; average Q, deformation ⁷⁴Ge(⁸²Se,4nγ): 1992Sm01: E=324, 335, 346 MeV, γ, γγ; SD band population.

SD-1 band: 2007La20, 2002La02, 2002La35, 1997Ni01, 1996Sa15, 1995Ce08, 1994Da20, 1992Mu10, 1992Sm01, 1991Be12, 1989AlZS, 1987Be41, 1987De17, 1986Tw01.

SD-2, SD-3, SD-4, SD-5, SD-6 bands: 1994Da20.

SD-6 band: 2002La35.

Search for hyperdeformation: 1993Ga10 (1993Ra08), 1995Vi02, 1996TwZZ, 1997Sm11, 1997Lu11, 1997Lu05, 2000Ri03. No discrete hyperdeformation structure found in 2000Ri03.

Additional information 1.

1993Ga10 (1993Ra08) present evidence for a hyperdeformed band from the reaction ¹²⁰Sn(³⁷Cl,p4nγ)¹⁵²Dy or ¹²⁰Sn(³⁷Cl,p3nγ)¹⁵³Dy, consisting of a cascade of stretched quadrupole (from DCO ratio) gammas with spacing 30 keV 3, and tentative discrete transitions of 1237, 1266, 1299, 1327, 1356, 1383, 1411, 1442, 1471, 1501, 1525. The 30 keV γ-ray spacing leads to β₂≥0.9, consistent with a hyperdeformed prolate shape with major-to-minor axis ratio of 3:1. The estimated spins of this band ranged from 78 to 98 (if dynamic moment of inertia=static moment of inertia) to 60 to 80 (from total Routhian surface calculation). 1995Vi02 (1995Lu03,1997Lu11) found evidence for a similar structure, and assigned it to ¹⁵²Dy by showing that the 30 keV γ-ray ridge is in coin with ¹⁵²Dy γ's above the 17⁺, 60-ns isomer. The intensity of this band is ≈10% of that of the SD-1 band. This band is omitted here since its existence has not been confirmed in recent higher statistics data of 1996TwZZ, 1997Sm11, 1997Lu05 and 2000Ri03.

¹⁵²Dy Levels

E(level) [†]	J ^π [‡]	T _{1/2} [#]	Comments
5088.1 3	(17) ⁺	60 ns 4	T _{1/2} : from Adopted Levels.
5341.7 3	18 ⁺		
5867.0 3	19 ⁻		
6111.5 4	(20) ⁺		

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¹⁰⁸Pd(⁴⁸Ca,4n γ):SD (continued)

¹⁵²Dy Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	Comments
6129.4 3	21 ⁻		
6537.0 11			
6737.1 4	(22 ⁺)		
7120.1 4	23 ⁻		
7661.3 4	25 ⁻		
7881.9 4	27 ⁻		
8185.9 11			
8848.8 4	28 ⁺		
8996.3 5	29 ⁺		
9180? 2	(26 ⁺ to 30 ⁺)		
10643.0 @& 20	(24 ⁺)		J ^π : from 2002La02. The same J ^π was proposed by 1994Da20. Theoretical analysis suggests J=24 or 26 (1993Ra07). Others: J=25 (1991Ze01), (22 ⁺) (1991Be12). Feeding out of band: see 2002La02. Others: fraction of decay out of band: 0.21 (1989AlZS); 19% 4 to the 25 ⁻ level; 6% 5 to the 23 ⁻ level; 56% 14 to the 21 ⁻ level; 19% 4 to the 19 ⁻ level (1986Tw01); 75% of the deexcitation of the band is via the 60-ns isomer (1986Tw01); 35% 15 of the γ flow from the SD states bypasses the 17 ⁺ 60 ns isomer (1987De17).
11245.4 @& 20	(26 ⁺)		Fraction of decay out of band: 0.25 (1989AlZS).
11892.9 @& 20	(28 ⁺)		Fraction of decay out of band: 0.54 (1989AlZS).
12585.6 @& 20	(30 ⁺)	30 fs	T _{1/2} (apparent)= 146 fs 14 (1991Be12).
13323.7 @& 20	(32 ⁺)	22 fs	T _{1/2} (apparent)= 94 fs 12 (1991Be12).
14107.7 @& 20	(34 ⁺)	16 fs	T _{1/2} (apparent)= 78 fs 8 (1991Be12).
14236.9 ^e 25	(31 ⁻)		
14937.6 @& 20	(36 ⁺)	12 fs	T _{1/2} (apparent)= 60 fs 7 (1991Be12).
14998.4 ^e 25	(33 ⁻)		
15802.9 ^e 25	(35 ⁻)		
15814.0 @& 20	(38 ⁺)	9.3 fs	T _{1/2} (apparent)= 45 fs 6 (1991Be12).
16652.6 ^e 25	(37 ⁻)		
16737.2 @& 20	(40 ⁺)	7.1 fs	T _{1/2} (apparent)= 37 fs 5 (1991Be12).
17547.5 ^e 25	(39 ⁻)		
17707.4 @& 20	(42 ⁺)	5.5 fs	T _{1/2} (apparent)= 30 fs 5 (1991Be12).
18488.7 ^e 25	(41 ⁻)		
18724.8 @& 20	(44 ⁺)	4.4 fs	T _{1/2} (apparent)= 22 fs 5 (1991Be12).
19474.8 ^e 25	(43 ⁻)		
19789.7 @& 20	(46 ⁺)	3.5 fs	T _{1/2} (apparent)= 22 fs 5 (1991Be12).
20506.1 ^e 25	(45 ⁻)		
20902.4 @& 20	(48 ⁺)	2.8 fs	T _{1/2} (apparent)= 15 fs 6 (1991Be12).
21583.4 ^e 25	(47 ⁻)		
22062.9 @& 20	(50 ⁺)	2.3 fs	T _{1/2} (apparent)= 20 fs 6 (1991Be12).
22706.1 ^e 25	(49 ⁻)		
23271.5 @& 20	(52 ⁺)	1.8 fs	T _{1/2} (apparent)= 9 fs 6 (1991Be12).
23873.2 ^e 25	(51 ⁻)		
24528.1 @& 20	(54 ⁺)	1.5 fs	T _{1/2} (apparent)= 8 fs 5 (1991Be12).
25084.8 ^e 25	(53 ⁻)		
25832.9 @& 20	(56 ⁺)	1.2 fs	T _{1/2} (apparent)= 5 fs +7-5 (1991Be12).
26341.5 ^e 25	(55 ⁻)		
27185.8 @& 20	(58 ⁺)	1.0 fs	T _{1/2} (apparent)= 15 fs 9 (1991Be12).
27641.4 ^e 25	(57 ⁻)		
28587.1 @& 20	(60 ⁺)	0.90 fs	T _{1/2} (apparent)= 3.5 fs +70-35 (1991Be12).
28985.7 ^e 25	(59 ⁻)		

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$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma):\text{SD}$ (continued) ^{152}Dy Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	Comments
30036.7@& 20	(62 ⁺)	0.69 fs	T _{1/2} (apparent)< 7 fs (1991Be12).
30374.1 ^e 25	(61 ⁻)		
31534.5@& 20	(64 ⁺)		
31807.6 ^e 25	(63 ⁻)		
33080.1@& 20	(66 ⁺)		
33285.6 ^e 30	(65 ⁻)		
34660@&	(68 ⁺)		
x ^a	(34)		
825.9+x ^a 10	(36)		
1681.3+x ^a 10	(38)		
2576.5+x ^a 10	(40)		
3508.7+x ^a 11	(42)		
4478.6+x ^a 12	(44)		
5487.1+x ^a 13	(46)		
6536.3+x ^a 13	(48)		
7628.9+x ^a 13	(50)		
8766.5+x ^a 13	(52)		
9949.9+x ^a 13	(54)		
11180.5+x ^a 13	(56)		
12458.2+x ^a 14	(58)		
13785.6+x ^a 15	(60)		
15162.7+x ^a 18	(62)		
16586.3+x ^a 20	(64)		
18063.4+x ^a 23	(66)		
y ^b	(36)		
793.0+y ^b 2	(38)		
1632.7+y ^b 3	(40)		
2523.9+y ^b 3	(42)		
3468.7+y ^b 4	(44)		
4466.9+y ^b 4	(46)		
5519.3+y ^b 5	(48)		
6624.2+y ^b 5	(50)		
7781.1+y ^b 6	(52)		
8989.0+y ^b 6	(54)		
10249.4+y ^b 6	(56)		
11563.2+y ^b 7	(58)		
12931.8+y ^b 7	(60)		
14357.6+y ^b 7	(62)		
15840.3+y ^b 7	(64)		
17384.4+y ^b 8	(66)		
18989.1+y ^b 8	(68)		
z ^c	(27 ⁻)		
669.6+z ^c 5	(29 ⁻)		
1390.6+z ^c 5	(31 ⁻)		
2163.4+z ^c 6	(33 ⁻)		
2988.4+z ^c 6	(35 ⁻)		
3865.2+z ^c 6	(37 ⁻)		
4794.2+z ^c 7	(39 ⁻)		

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¹⁰⁸Pd(⁴⁸Ca,4n γ):SD (continued)

¹⁵²Dy Levels (continued)

E(level) [†]	J π^{\ddagger}	E(level) [†]	J π^{\ddagger}	E(level) [†]	J π^{\ddagger}	E(level) [†]	J π^{\ddagger}
5772.9+z ^c 7	(41 ⁻)	12703.4+z ^c 10	(53 ⁻)	2084.0+u ^d 7	(32 ⁻)	7649.1+u ^d 9	(44 ⁻)
6802.7+z ^c 7	(43 ⁻)	14031.1+z ^c 11	(55 ⁻)	2882.8+u ^d 7	(34 ⁻)	8754.1+u ^d 10	(46 ⁻)
7883.5+z ^c 8	(45 ⁻)	15407.0+z ^c 15	(57 ⁻)	3733.9+u ^d 7	(36 ⁻)	9909.9+u ^d 11	(48 ⁻)
9014.1+z ^c 8	(47 ⁻)	u ^d	(26 ⁻)	4635.2+u ^d 8	(38 ⁻)	11115.7+u ^d 11	(50 ⁻)
10194.4+z ^c 8	(49 ⁻)	642.1+u ^d 5	(28 ⁻)	5589.0+u ^d 8	(40 ⁻)	12369.5+u ^d 11	(52 ⁻)
11422.4+z ^c 8	(51 ⁻)	1337.0+u ^d 6	(30 ⁻)	6594.1+u ^d 9	(42 ⁻)	13673.7+u ^d 13	(54 ⁻)

[†] 2002La02 report transitions deexciting SD-1 to normal states. The normal states to which the SD-1 band decays, as given by 2002La02 down to the 60-ns isomer at 5088, are included here. For the complete level scheme for the normal levels seen in the in-beam studies see Gd(α ,xn γ),(HI,xn γ).

[‡] Assignments for the SD bands are from 1997Da20. These agree with those in 2007La20 (see also 2002La02 and 2002La35). J π for the 68⁺ member of SD-1 is from 2007La20. The evaluator has put all these assignments in parens. Assignments for the normal band members are from Adopted Levels.

[#] From 1987Be41, 1991Be12; intrinsic half-life deduced from Q(intrinsic)=18.3. The measured apparent (not corrected for feeding times) lifetime (from DSAM) is given under comments. Assuming constant deformation, model-dependent Q(intrinsic)=18.3 was deduced from the apparent lifetime data.

[@] Relative level-energy uncertainty is from 0.1 to 0.5 keV as the excitation energy increases. Absolute uncertainty of 2 keV is essentially due to 2 keV uncertainty in the 4011 connecting transition.

[&] Band(A): SD-1 band (1986Tw01,1991Be12,1994Da20,2002La02,2002La35, 2007La20) Q(intrinsic)=17.5 +4-2 (1997Ni01), 17.5 2 (1996Sa15), 18 4 (1995Ce08), 18 3 (1991Be12). Configuration: $\pi 6^4 \nu 7^{+2}$ (1993Cu06,1991Be12). Percent population in different reactions: 1.47 7 in ¹⁰⁸Pd(⁴⁸Ca,4n γ) E= 200 MeV (1992Sm01); 1.80 15 (E=317 MeV), 2.25 19 (E=328 MeV), 2.07 20 (E=339 MeV) in ⁷⁴Ge(⁸²Se,4n γ) (1992Sm01); 1.12 in ¹²⁰Sn(³⁶S,4n γ) E= 170 MeV (1992Sm01); 0.7 2 (E=160 MeV), 1.1 3 (E=170 MeV) in ¹²⁴Sn(³³S,5n γ) (1992Mu10).

^a Band(B): SD-2 band (1994Da20). If $\pi=+$, configuration= $(\pi 6^{+4})(\pi 7^{+1})(\pi, 1/2[301]^{-1})(\nu 7^{+2})$ (1994Da20). If $\pi=-$, configuration= $(\pi 6^{+3})(\pi 7^{+1})(\pi, 3/2[651]^{-1})(\nu, 7^2)$ (1994Da20). Relative population=7.5% 15 of SD-1 band (1994Da20).

^b Band(C): SD-3 band (1994Da20). relative population: 8.4% 12 of SD-1 band (1994Da20).

^c Band(D): SD-4 band (1994Da20). SD-4 and SD-5 are possible signature partners with configuration= $(\pi 6^{+4})(\nu 7^{+1})(\nu 5/2[402]^{+1})$ (1994Da20). Relative population: 4% 1 of SD-1 band (1994Da20).

^d Band(E): SD-5 band (1994Da20). SD-4 and SD-5 are possible signature partners with configuration= $(\pi 6^{+4})(\nu 7^{+1})(\nu, 5/2[402]^{+1})$ (1994Da20). Relative population: 4% 1 of SD-1 band (1994Da20).

^e Band(F): SD-6 band (1994Da20,2002La35, 2007La20) Possible configuration: $\pi 6^{+4} \nu 7^{+3}$ (yrast SD of ¹⁵³Dy) coupled to a hole in any of the following neutron orbitals: 1/2[411], 5/2[642], 1/2[651] (1994Da20). Relative population: 5% 1 of SD-1 band (1994Da20). Interconnections of SD-6 to SD-1 band reported by 2002La35 with 53% 8 of the decay of this band proceeding through SD-1 band.

$\gamma(^{152}\text{Dy})$

The following sum peaks in triple coincidence with SD-1 γ 's were observed by 1995Be20 (intensities given are per 100 SD-1 transitions): 3680 6 (7% 3), 3822 6 (11% 4), 4399 6 (10% 4), 4462 6 (8% 3); (peak width=12 keV 4, consistent with a sum peak consisting of 2 γ 's); 3585 6, 5017 6 (with no reliable estimate of Γ or intensity); and 3242 6 (25% 8) (peak width= \approx 20 keV, possibly consisting of more than one sum peak).

E γ ^{†‡}	E _i (level)	J π _i	E _f	J π _f	I _(γ+ce) ^{@&}
147.42 9	8996.3	29 ⁺	8848.8	28 ⁺	\approx 2
220.62 12	7881.9	27 ⁻	7661.3	25 ⁻	23
253.58 8	5341.7	18 ⁺	5088.1	(17) ⁺	83

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$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma):SD$ (continued) $\gamma(^{152}\text{Dy})$ (continued)

E_γ †‡	I_γ #	$E_i(\text{level})$	J_i^π	E_f	J_f^π	$I_{(\gamma+ce)}$ @&
262.44 8		6129.4	21 ⁻	5867.0	19 ⁻	44
304		8185.9		7881.9	27 ⁻	6
525.27 11		5867.0	19 ⁻	5341.7	18 ⁺	54
541.16 13		7661.3	25 ⁻	7120.1	23 ⁻	31
602.4 1	17 3	11245.4	(26 ⁺)	10643.0	(24 ⁺)	13
625.46 24		6737.1	(22 ⁺)	6111.5	(20 ⁺)	15
642.1 5		642.1+u	(28 ⁻)	u	(26 ⁻)	
647.5 1	51 7	11892.9	(28 ⁺)	11245.4	(26 ⁺)	40
669.6 5		669.6+z	(29 ⁻)	z	(27 ⁻)	
670		6537.0		5867.0	19 ⁻	6
692.7 1	101 10	12585.6	(30 ⁺)	11892.9	(28 ⁺)	
694.9 4		1337.0+u	(30 ⁻)	642.1+u	(28 ⁻)	
721.0 2		1390.6+z	(31 ⁻)	669.6+z	(29 ⁻)	
738.1 1	93 11	13323.7	(32 ⁺)	12585.6	(30 ⁺)	
747.0 2		2084.0+u	(32 ⁻)	1337.0+u	(30 ⁻)	
761.5 2		14998.4	(33 ⁻)	14236.9	(31 ⁻)	27 ^a 8
769.65 21		6111.5	(20 ⁺)	5341.7	18 ⁺	25
772.8 2		2163.4+z	(33 ⁻)	1390.6+z	(31 ⁻)	
784.0 1	96 11	14107.7	(34 ⁺)	13323.7	(32 ⁺)	
793.0 2		793.0+y	(38)	y	(36)	
798.8 2		2882.8+u	(34 ⁻)	2084.0+u	(32 ⁻)	
804.5 2		15802.9	(35 ⁻)	14998.4	(33 ⁻)	51 ^a 6
825.0 2		2988.4+z	(35 ⁻)	2163.4+z	(33 ⁻)	
825.9 10		825.9+x	(36)	x	(34)	
829.9 1	101 8	14937.6	(36 ⁺)	14107.7	(34 ⁺)	
839.7 2		1632.7+y	(40)	793.0+y	(38)	
849.7 2		16652.6	(37 ⁻)	15802.9	(35 ⁻)	64 ^a 7
851.1 2		3733.9+u	(36 ⁻)	2882.8+u	(34 ⁻)	
855.4 2		1681.3+x	(38)	825.9+x	(36)	
876.4 1	108 11	15814.0	(38 ⁺)	14937.6	(36 ⁺)	
876.8 2		3865.2+z	(37 ⁻)	2988.4+z	(35 ⁻)	
891.2 2		2523.9+y	(42)	1632.7+y	(40)	
894.9 2		17547.5	(39 ⁻)	16652.6	(37 ⁻)	66 ^a 7
895.2 2		2576.5+x	(40)	1681.3+x	(38)	
901.3 2		4635.2+u	(38 ⁻)	3733.9+u	(36 ⁻)	
923.2 1	104 10	16737.2	(40 ⁺)	15814.0	(38 ⁺)	
929.0 2		4794.2+z	(39 ⁻)	3865.2+z	(37 ⁻)	
932.2 2		3508.7+x	(42)	2576.5+x	(40)	
941.2 2		18488.7	(41 ⁻)	17547.5	(39 ⁻)	78 ^a 4
944.8 2		3468.7+y	(44)	2523.9+y	(42)	
953.8 2		5589.0+u	(40 ⁻)	4635.2+u	(38 ⁻)	
966.93 15		8848.8	28 ⁺	7881.9	27 ⁻	14
969.9 5		4478.6+x	(44)	3508.7+x	(42)	
970.2 1	100 11	17707.4	(42 ⁺)	16737.2	(40 ⁺)	
978.7 2		5772.9+z	(41 ⁻)	4794.2+z	(39 ⁻)	
986.1 2		19474.8	(43 ⁻)	18488.7	(41 ⁻)	98 ^a 14
990.76 14		7120.1	23 ⁻	6129.4	21 ⁻	40
998.2 2		4466.9+y	(46)	3468.7+y	(44)	
1005.1 5		6594.1+u	(42 ⁻)	5589.0+u	(40 ⁻)	
1008.5 5		5487.1+x	(46)	4478.6+x	(44)	
1017.4 1	98 12	18724.8	(44 ⁺)	17707.4	(42 ⁺)	
1029.8 2		6802.7+z	(43 ⁻)	5772.9+z	(41 ⁻)	
1031.3 2		20506.1	(45 ⁻)	19474.8	(43 ⁻)	99 ^a 7
1049.2 2		6536.3+x	(48)	5487.1+x	(46)	
1052.4 2		5519.3+y	(48)	4466.9+y	(46)	
1055.0 2		7649.1+u	(44 ⁻)	6594.1+u	(42 ⁻)	

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$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma):SD$ (continued) $\gamma(^{152}\text{Dy})$ (continued)

E_γ †	I_γ #	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ^c	$I_{(\gamma+ce)}$ @&	Comments
1064.9	1	98	8	19789.7	(46 ⁺)	18724.8	(44 ⁺)	
1077.3	2			21583.4	(47 ⁻)	20506.1	(45 ⁻)	101 ^a 7
1080.8	2			7883.5+z	(45 ⁻)	6802.7+z	(43 ⁻)	
1092.6	2			7628.9+x	(50)	6536.3+x	(48)	
1104.9	2			6624.2+y	(50)	5519.3+y	(48)	
1105.0	2			8754.1+u	(46 ⁻)	7649.1+u	(44 ⁻)	
1112.7	1	90	10	20902.4	(48 ⁺)	19789.7	(46 ⁺)	
1122.7	2			22706.1	(49 ⁻)	21583.4	(47 ⁻)	
1130.6	2			9014.1+z	(47 ⁻)	7883.5+z	(45 ⁻)	
1137.6	2			8766.5+x	(52)	7628.9+x	(50)	
1155.8	5			9909.9+u	(48 ⁻)	8754.1+u	(46 ⁻)	
1156.9	2			7781.1+y	(52)	6624.2+y	(50)	
1160.5	1	87	6	22062.9	(50 ⁺)	20902.4	(48 ⁺)	
1167.1	2			23873.2	(51 ⁻)	22706.1	(49 ⁻)	
1180.3	2			10194.4+z	(49 ⁻)	9014.1+z	(47 ⁻)	
1183.4	2			9949.9+x	(54)	8766.5+x	(52)	
1205.8	2			11115.7+u	(50 ⁻)	9909.9+u	(48 ⁻)	
1207.9	2			8989.0+y	(54)	7781.1+y	(52)	
1208.6	1	89	12	23271.5	(52 ⁺)	22062.9	(50 ⁺)	
1211.6	2			25084.8	(53 ⁻)	23873.2	(51 ⁻)	
1228.0	3			11422.4+z	(51 ⁻)	10194.4+z	(49 ⁻)	
1230.6	2			11180.5+x	(56)	9949.9+x	(54)	
1253.8	3			12369.5+u	(52 ⁻)	11115.7+u	(50 ⁻)	
1256.6	1	75	10	24528.1	(54 ⁺)	23271.5	(52 ⁺)	
1256.7	2			26341.5	(55 ⁻)	25084.8	(53 ⁻)	
1260.4	2			10249.4+y	(56)	8989.0+y	(54)	
1277.7	2			12458.2+x	(58)	11180.5+x	(56)	
1281.0	5			12703.4+z	(53 ⁻)	11422.4+z	(51 ⁻)	
1299.9	2			27641.4	(57 ⁻)	26341.5	(55 ⁻)	
1304.2	5			13673.7+u	(54 ⁻)	12369.5+u	(52 ⁻)	
1304.8	1	62	7	25832.9	(56 ⁺)	24528.1	(54 ⁺)	
1313.8	2			11563.2+y	(58)	10249.4+y	(56)	
1327.4	5			13785.6+x	(60)	12458.2+x	(58)	
1327.7	5			14031.1+z	(55 ⁻)	12703.4+z	(53 ⁻)	
1344.3	2			28985.7	(59 ⁻)	27641.4	(57 ⁻)	
1352.9	1	49	8	27185.8	(58 ⁺)	25832.9	(56 ⁺)	
1368.6	2			12931.8+y	(60)	11563.2+y	(58)	
1375.9	10			15407.0+z	(57 ⁻)	14031.1+z	(55 ⁻)	
1377.1	10			15162.7+x	(62)	13785.6+x	(60)	
1388.4	5			30374.1	(61 ⁻)	28985.7	(59 ⁻)	
1401.3	1	30	7	28587.1	(60 ⁺)	27185.8	(58 ⁺)	
1423.6	10			16586.3+x	(64)	15162.7+x	(62)	
1425.8	2			14357.6+y	(62)	12931.8+y	(60)	
1433.5	10			31807.6	(63 ⁻)	30374.1	(61 ⁻)	
1449.6	2	16	6	30036.7	(62 ⁺)	28587.1	(60 ⁺)	
1477.1	10			18063.4+x	(66)	16586.3+x	(64)	
1478				33285.6	(65 ⁻)	31807.6	(63 ⁻)	
1482.7	2			15840.3+y	(64)	14357.6+y	(62)	
1497.8	3			31534.5	(64 ⁺)	30036.7	(62 ⁺)	
1544.1	2			17384.4+y	(66)	15840.3+y	(64)	
1545.6	5			33080.1	(66 ⁺)	31534.5	(64 ⁺)	
1580				34660	(68 ⁺)	33080.1	(66 ⁺)	E_γ : From 2007La20.
1604.7	2			18989.1+y	(68)	17384.4+y	(66)	
1645 ^e				14236.9	(31 ⁻)	12585.6	(30 ⁺)	<3 ^a
1676				14998.4	(33 ⁻)	13323.7	(32 ⁺)	D 6 ^a 2 $A_2=-0.9$ 4 (2002La35)
1696				15802.9	(35 ⁻)	14107.7	(34 ⁺)	D 6 ^a 2 $A_2=-0.3$ 3 (2002La35)

Continued on next page (footnotes at end of table)

¹⁰⁸Pd(⁴⁸Ca,4nγ):SD (continued)

γ(¹⁵²Dy) (continued)

<u>E_γ^{†‡}</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.^c</u>	<u>I_(γ+ce)^{@&}</u>	<u>Comments</u>
1715	16652.6	(37 ⁻)	14937.6	(36 ⁺)	D	7 ^a 2	A ₂ =-0.3 3 (2002La35)
1734	17547.5	(39 ⁻)	15814.0	(38 ⁺)		5 ^a 2	
1751	18488.7	(41 ⁻)	16737.2	(40 ⁺)		6 ^a 2	
1767	19474.8	(43 ⁻)	17707.4	(42 ⁺)		6 ^a 2	
1781	20506.1	(45 ⁻)	18724.8	(44 ⁺)		2 ^a 1	
1795	21583.4	(47 ⁻)	19789.7	(46 ⁺)		3 ^a 1	
^x 1806 ^d							I _γ : 2.4% 8 of the intensity of the SD-1 band (1995Be20).
^x 1997 ^d							I _γ : 1.2% 5 of the intensity of the SD-1 band (1995Be20).
^x 2229 ^d							I _γ : 1.4% 5 of the intensity of the SD-1 band, possibly a doublet (1995Be20).
2713 ^{be} 4	11892.9	(28 ⁺)	9180?	(26 ⁺ to 30 ⁺)			I _γ : intensity is same or higher than that of the 4011γ.
2895 4	11892.9	(28 ⁺)	8996.3	29 ⁺		≈0.3	
3044 ^e 4	11892.9	(28 ⁺)	8848.8	28 ⁺		≈0.3	
3364 4	11245.4	(26 ⁺)	7881.9	27 ⁻		≈0.2	
3585 4	11245.4	(26 ⁺)	7661.3	25 ⁻		≈0.3	
4011 ^b 2	11892.9	(28 ⁺)	7881.9	27 ⁻	D	0.9 2	A ₂ =-0.35 12; A ₄ =-0.02 16 (2002La02) Mult.: A ₂ and A ₄ are consistent only with a ΔJ=1 dipole transition.

[†] E_γ for transitions within the super-deformed bands are from 1994Da20. Values for SD-1 are also reported by 2007La20 who extend the band by one level to J=68. for transitions connecting SD-6 with SD-1 and transitions connecting SD-1 with normal-deformed levels are from.

[‡] E_γ for super-deformed bands are from 1994Da20. E_γ for normal band members are from Adopted Gammas. 2007La20 also report E_γ for members of the SD-1 band and extend this band by one level to J=68. No uncertainties are given, but the energies are mostly lower than those of 1994Da20, by up to 1.3 keV. The cumulative effect leads to E=33068 for the 66⁺ level, compared with E=33080 as given here. E_γ for transitions linking SD-1 and SD-6, and transitions linking SD-1 with normally deformed states are from 2002La35. These latter transitions are also reported in 2002La02, and uncertainties have been communicated from T. Lauritsen to Balraj Singh (Feb. 5, 2002).

[#] Relative photon intensities for SD-1 are from 1991Be12 normalized to I_γ=100 for the average of I_γ for the transitions between 693 and 1017.

[@] Label=I_γ.

[&] Relative transition intensities from 2002La02 normalized to I_γ(784γ)=100.

^a Relative transition intensity from 2002La35 for SD-6 normalized to 100 for the average of the 1077 and 1031 transitions.

^b Connecting transition from 2002La02 with uncertainty from an e-mail reply from T. Lauritsen to Balraj Singh (Feb. 5, 2002).

^c From γ(θ) (2002La35).

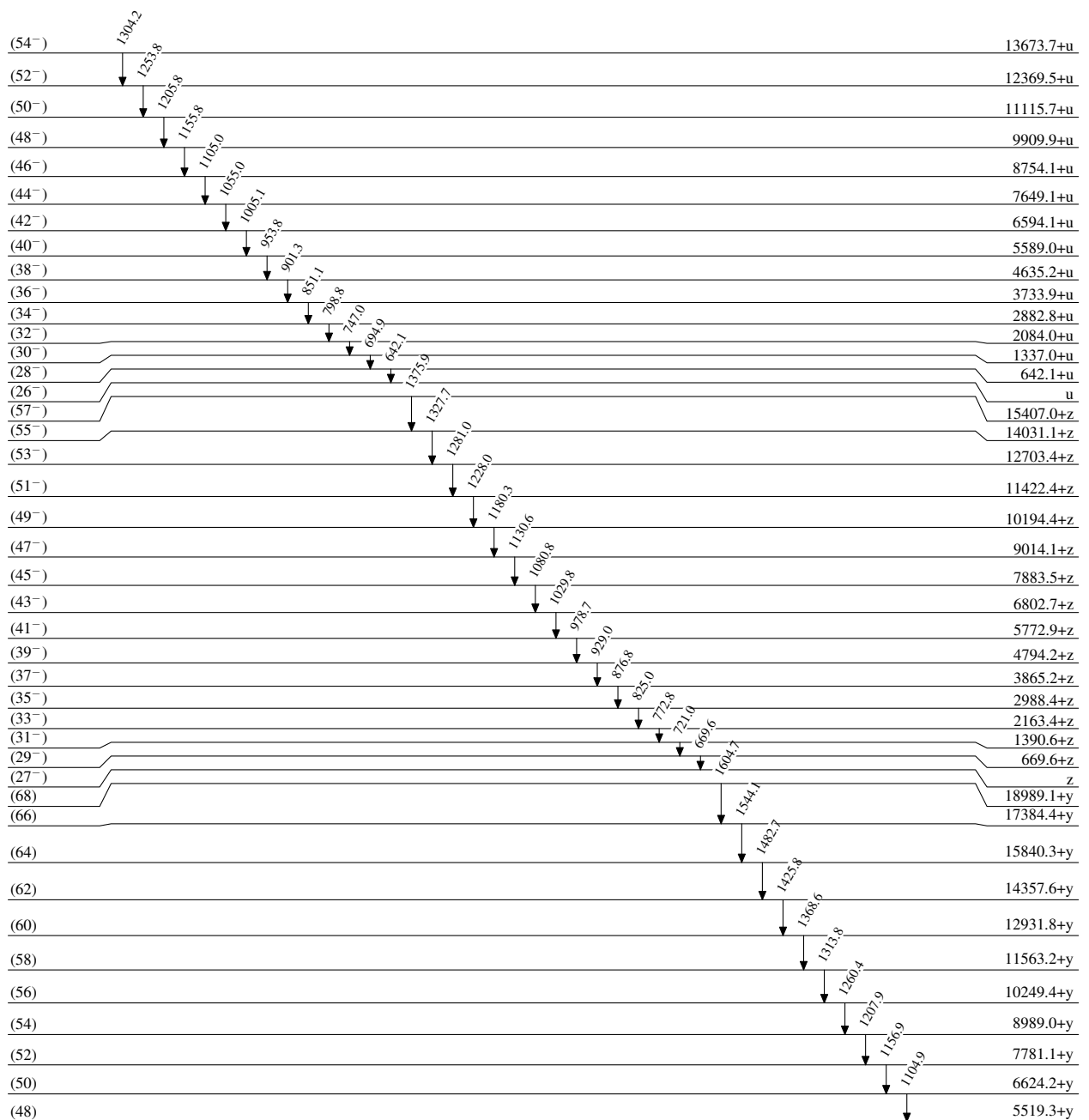
^d γ in triple coincidence with members of SD-1 band, possible linking transition to the normal deformed states (1995Be20).

^e Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma)\text{SD}$

Level Scheme

Intensities: Relative I_γ 

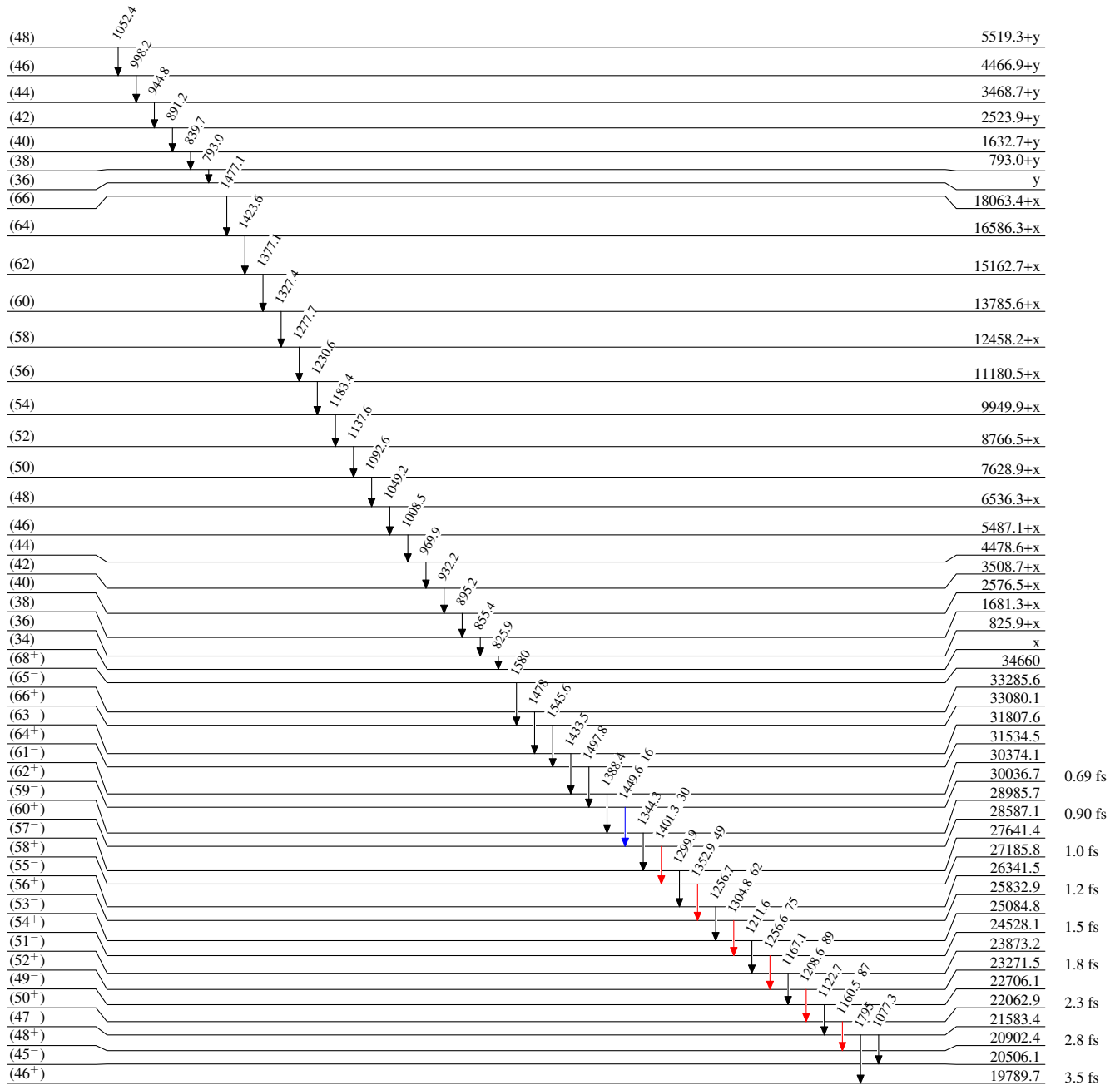
¹⁰⁸Pd(⁴⁸Ca,4nγ):SD

Level Scheme (continued)

Intensities: Relative I_γ

Legend

- I_γ < 2% × I_γ^{max}
- I_γ < 10% × I_γ^{max}
- I_γ > 10% × I_γ^{max}



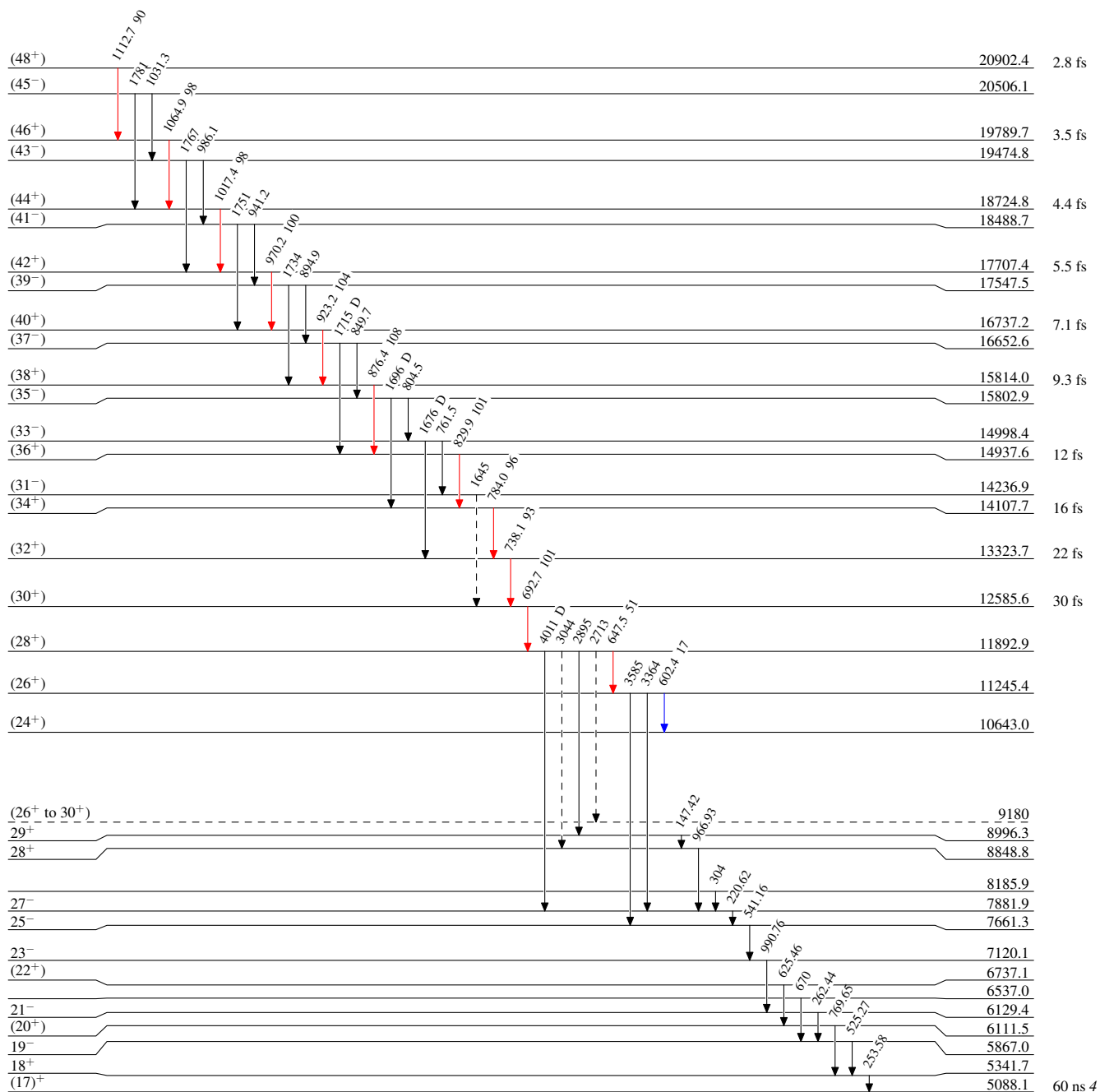
$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma):\text{SD}$

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



$^{152}_{66}\text{Dy}_{86}$

$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma):SD$

		Band(B): SD-2 band (1994Da20)	
	(66)	18063.4+x	
	(64)	1477 16586.3+x	
	(62)	1424 15162.7+x	
	(60)	1377 13785.6+x	
	(58)	1327 12458.2+x	
	(56)	1278 11180.5+x	
	(54)	1231 9949.9+x	
	(52)	1183 8766.5+x	
	(50)	1138 7628.9+x	
	(48)	1093 6536.3+x	
	(46)	1049 5487.1+x	
	(44)	1008 4478.6+x	
	(42)	970 3508.7+x	
	(40)	932 2576.5+x	
	(38)	895 1681.3+x	
	(36)	855 825.9+x	
	(34)	826	x
Band(A): SD-1 band (1986Tw01,1991Be12, 1994Da20,2002La02, 2002La35, 2007La20) Q(intrinsic)=17.5 +4-2 (1997Ni01), 17.5 2 (1996Sa15), 18 4 (1995Ce08), 18 3 (1991Be12)			
(68 ⁺)		34660	
(66 ⁺)	1580	33080.1	
(64 ⁺)	1546	31534.5	
(62 ⁺)	1498	30036.7	
(60 ⁺)	1450	28587.1	
(58 ⁺)	1401	27185.8	
(56 ⁺)	1353	25832.9	
(54 ⁺)	1305	24528.1	
(52 ⁺)	1257	23271.5	
(50 ⁺)	1209	22062.9	
(48 ⁺)	1160	20902.4	
(46 ⁺)	1113	19789.7	
(44 ⁺)	1065	18724.8	
(42 ⁺)	1017	17707.4	
(40 ⁺)	970	16737.2	
(38 ⁺)	923	15814.0	
(36 ⁺)	876	14937.6	
(34 ⁺)	830	14107.7	
(32 ⁺)	784	13323.7	
(30 ⁺)	738	12585.6	
(28 ⁺)	693	11892.9	
(26 ⁺)	648	11245.4	
(24 ⁺)	602	10643.0	

$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma):\text{SD (continued)}$

		Band(E): SD-5 band (1994Da20)	
(54 ⁻)		13673.7+u	
(52 ⁻)	1304	12369.5+u	
(50 ⁻)	1254	11115.7+u	
(48 ⁻)	1206	9909.9+u	
(46 ⁻)	1156	8754.1+u	
(44 ⁻)	1105	7649.1+u	
(42 ⁻)	1055	6594.1+u	
(40 ⁻)	1005	5589.0+u	
(38 ⁻)	954	4635.2+u	
(36 ⁻)	901	3733.9+u	
(34 ⁻)	851	2882.8+u	
(32 ⁻)	799	2084.0+u	
(30 ⁻)	747	1337.0+u	
(28 ⁻)	695	642.1+u	
(26 ⁻)	642	u	
		Band(D): SD-4 band (1994Da20)	
(57 ⁻)		15407.0+z	
(55 ⁻)	1376	14031.1+z	
(53 ⁻)	1328	12703.4+z	
(51 ⁻)	1281	11422.4+z	
(49 ⁻)	1228	10194.4+z	
(47 ⁻)	1180	9014.1+z	
(45 ⁻)	1131	7883.5+z	
(43 ⁻)	1081	6802.7+z	
(41 ⁻)	1030	5772.9+z	
(39 ⁻)	979	4794.2+z	
(37 ⁻)	929	3865.2+z	
(35 ⁻)	877	2988.4+z	
(33 ⁻)	825	2163.4+z	
(31 ⁻)	773	1390.6+z	
(29 ⁻)	721	669.6+z	
(27 ⁻)	670	z	
		Band(C): SD-3 band (1994Da20)	
(68)		18989.1+y	
(66)	1605	17384.4+y	
(64)	1544	15840.3+y	
(62)	1483	14357.6+y	
(60)	1426	12931.8+y	
(58)	1369	11563.2+y	
(56)	1314	10249.4+y	
(54)	1260	8989.0+y	
(52)	1208	7781.1+y	
(50)	1157	6624.2+y	
(48)	1105	5519.3+y	
(46)	1052	4466.9+y	
(44)	998	3468.7+y	
(42)	945	2523.9+y	
(40)	891	1632.7+y	
(38)	840	793.0+y	
(36)	793	y	

$^{108}\text{Pd}(^{48}\text{Ca},4n\gamma):\text{SD (continued)}$

Band(F): SD-6 band
(1994Da20,2002La35,
2007La20) Possible
configuration:
 $\pi 6^{+4} \nu 7^{+3}$ (yrast SD
of ^{153}Dy) coupled to a
hole in any of the
following neutron
orbitals: 1/2[411],
5/2[642], 1/2[651]
(1994Da20)

(65 ⁻)	33285.6
	↓ 1478
(63 ⁻)	31807.6
	↓ 1434
(61 ⁻)	30374.1
	↓ 1388
(59 ⁻)	28985.7
	↓ 1344
(57 ⁻)	27641.4
	↓ 1300
(55 ⁻)	26341.5
	↓ 1257
(53 ⁻)	25084.8
	↓ 1212
(51 ⁻)	23873.2
	↓ 1167
(49 ⁻)	22706.1
	↓ 1123
(47 ⁻)	21583.4
	↓ 1077
(45 ⁻)	20506.1
	↓ 1031
(43 ⁻)	19474.8
	↓ 986
(41 ⁻)	18488.7
	↓ 941
(39 ⁻)	17547.5
	↓ 895
(37 ⁻)	16652.6
	↓ 850
(35 ⁻)	15802.9
	↓ 804
(33 ⁻)	14998.4
	↓ 762
(31 ⁻)	14236.9

 $^{152}_{66}\text{Dy}_{86}$