^{208}Pb(p,p′),(pol p,p′)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 108,1583 (2007)	1-Jun-2007

1965Fr17 E=40 MeV.
1966Sc07 E=40 MeV.
1967Mo25 E=14-18 MeV, FWHM=9 keV.
1967Sa11 (also 1966Sa10) E=24.5 MeV.
1968Fu12 E=30 MeV.
1968Wh02 E=14-18 MeV, FWHM=26-32 keV.
1968Za01 E=14-18 MeV.
1969Ri10 (also 1967Ri13) E=14-18 MeV.
1970Ka10 E=30.3 MeV, pol P.
1970Ku13 E=16.490 MeV, FWHM<18 keV.
1973Le04 E=54 MeV, FWHM≈35-40 keV, θ=11° to 58°.
1975Wa18 E=35 MeV, FWHM=5-8 keV, θ=10° to 100°.
1976Fr21 E=24 MeV.
1976In03 E=185 MeV, FWHM<300 keV, θ=6° to 36°.
1977Sc17 E=61.2 MeV, FWHM=40-45 keV.
1978Bl02 E=800 MeV, FWHM=80-120 keV.
1978Mo04 E=40,45 MeV, FWHM=20-35 keV.
1980Ad01 E=135 MeV, FWHM=85 keV.
1980Ba46 E=135 MeV, FWHM=85 keV.
1980Ca14 E=800 MeV, FWHM≤150 keV.
1982Dj01 E=201 MeV, FWHM=60 keV.
1982Ga02 E=800 MeV, FWHM=50-60 keV.
1983Ti03 E=200 MeV, FWHM=900-1100 keV.
1984Dj03 see 1982Dj01.
1984Ka13 E(pol P)=104 MeV, FWHM≤250 keV.
1985Fu09 E=65 MeV, FWHM=10-15 keV.
1986Ad02 E=800 MeV.
1986Be14 E(pol P)=344 MeV, FWHM=70 keV.
1987Mc03 E=200, 400 MeV, FWHM=160, 200 keV.
1987Ta08 E=45 MeV, FWHM=12-18 keV.
1990Fu07 E=80 MeV, FWHM=18-23 keV.
1991Li22 see 1997Ka17.
1994Va34 E=20 MeV, FWHM=4 keV.
1997Ka17 E=200 MeV, FWHM=40 keV.
1997VaZT E=22 MeV, FWHM=4-5 keV.
2001Va04 E=22 MeV, FWHM=4-5 keV.
2006He21 E=14-18 MeV, FWHM=3 keV.
2007He01 E=14-18 MeV, FWHM=3 keV.
2007HeZW see 2006He21.
Others: 1987Ju06, 1985Dj01, 1979Bl10, 1978Ra17, 1976Fr21, 1974Ce03.

Giant resonance sum-rule depletion data of 1986Be14 were obtained from a DWBA calculation which reproduces known βR values for the 2614, 4085, and 4323 levels. Uncertainty is 20%. Authors′ %EWSR data, and those of 1985Mc06, do not confirm the low values reported by 1982Dj01, 1984Ka13, and 1975Ma07.
%EWSR=%energy−weighted sum rule.

Data of 2007He01, 2006He21, 1970Ku13, 1969Ri10, 1968Za01, 1968Wh02, 1967Mo25 At bombarding energies of 14-18 MeV preferentially populate states of ^{208}Pb via isobaric analog resonances In ^{209}Bi. On the basis of $\sigma(\theta)$In the proton resonant scattering At the energies of known analog resonances, dominant configurations for some of the ^{208}Pb levels are obtained. 2006He21 identify the six states of the $\nu 1i_{11/2}\nu 2f^{-1}_{5/2}$ multiplet and the four states of the $\nu 1i_{11/2}\nu 3p^{-1}_{3/2}$ multiplet. 1969Ri10

^{208}Pb(p,p′),(pol p,p′) (continued)

study members of the $\nu 2g_{9/2}\nu(nlj)^{-1}$ multiplet. These configurations are given In comments.

1966Sa10 E=24.5 MeV. Deformation Parameters Quoted In This Reference Are In Error. See 1977Sc17. Corrected Values, Quoted Here, Are Taken From 1977Sc17

1975Ma07 E=155 MeV, FWHM=140 keV For 4070 Level, 185 keV For The Giant Resonance Region

1986Mc06 E=200 MeV. E(pol P)=200 MeV, FWHM ≈ 1 MeV. The β_L Data For The Low-lying States Are Also Given In 1987Mc03

^{208}Pb Levels

Γ(P′) data (In keV) are from 1969Ri10 and 1970Ku13 for levels which resonate At $2g_{9/2}$ and $3d_{5/2}$ IAR, respectively. Each inelastic Γ At the indicated resonance includes contributions from all possible neutron holes.

E(level)[†‡]	L[4]	β_L[7]	Comments
0.0			
2614.5 *3*	3	0.120	L: L=3 confirmed by 1980Ad01, 1977Sc17, 1973Le04. β_L: others: 0.100 (1980Ad01), 0.103 (1977Sc17), 0.108 (1973Le04), 0.108 (1966Sa10). excitation function resonates At several IAR. %EWSR=20.4 (1985Fu09). B(E3)↑=0.67 *6* (1986Be14).
3197.7 *3*	5	0.058	configuration=$\nu 2g_{9/2}\nu 3p_{1/2}^{-1}$. L: L=5 confirmed by 1980Ad01, 1977Sc17, 1973Le04. β_L: others: 0.043 (1980Ad01) 0.044 (1977Sc17), 0.055 (1973Le04), 0.074 (1966Sa10). excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=22.9 keV.
3475.1 *14*			configuration=$\nu 2g_{9/2}\nu 3p_{1/2}^{-1}$. E(level): In 1997VaZT this energy is given As being from (d,p). The (p,p′) value is given there As 3474.1 *3*. excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=24.0 keV.
3708.5 *3*	5	0.034	configuration=$\nu 2g_{9/2}\nu 2f_{5/2}^{-1}$. L: L=5 confirmed by 1980Ad01, 1977Sc17, 1973Le04. β_L: others: 0.045 (1980Ad01), 0.032 (1977Sc17), 0.035 (1973Le04), 0.035 (1966Sa10). excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=8.0 keV.
3920.0 *3*			configuration=$\nu 2g_{9/2}\nu 2f_{5/2}^{-1}$. excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=6.5 keV.
3946.6 *3*			
3961.1 *3*	(5)	0.018	excitation function resonates At the $2g_{9/2}$ IAR (1967Mo25) with Γ(P′)=2.7 keV.
3995.6 *3*			excitation function resonates At the $2g_{9/2}$ IAR (1968Wh02) with Γ(P′)=5.1 keV.
4037.5 *3*	7	0.038	configuration=$\nu 2g_{9/2}\nu 2f_{5/2}^{-1}$. L: from 1977Sc17. 1975Wa18 report L=(7) and 1973Le04 report L≥6. β_L: other: 0.025 (1977Sc17). excitation function resonates At the $2g_{9/2}$ IAR (1968Wh02) with Γ(P′)=8.0 keV.
4051.2 *3*	(3)	0.013	
4085.4 *3*	2	0.058	L: L=2 confirmed by 1985Fu09, 1980Ad01, 1977Sc17, 1973Le04. β_L: others: 0.055 (1980Ad01), 0.055 (1977Sc17), 0.058 (1973Le04), 0.050 (1966Sa10). excitation function resonates At several IAR (1967Mo25). %EWSR=13.4 (1985Fu09). B(E2)↑=0.33 *1* (1986Be14).
4125.4 *5*			excitation function resonates At the $2g_{9/2}$ IAR (1967Mo25) with Γ(P′)=2.7 keV.
4180.2 *5*	(5)	0.018	configuration=$\nu 2g_{9/2}\nu 3p_{3/2}^{-1}$. excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=7.8 keV.
4206.2 *5*			excitation function resonates At the $1i_{11/2}$ IAR (1968Wh02).
4229.6 *5*			excitation function resonates At the $2g_{9/2}$ IAR? (1967Mo25) with Γ(P′)=1.6 keV. J^π: $\sigma(\theta)$ calculated with RPA and phenomenological wave function is consistent with $J^\pi=2^-$, not with

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	J$^{\pi}$[&]	L[4]	β_L[7]	Comments
				2^+.
4254.9 *5*				excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=9.7 keV.
4262.0 *5*				
4296.7 *5*		5	0.018	configuration=$\nu 2g_{9/2}\nu 3p^{-1}_{3/2}$. excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=9.4 keV.
4323.9 *5*		4	0.067	E(level): 1980Ad01 report E=4315 *10*. L: L=4 confirmed by 1980Ad01, 1977Sc17, 1973Le04. β_L: others: 0.064 (1980Ad01), 0.064 (1977Sc17), 0.069 (1973Le04), 0.063 (1966Sa10). B(E4)↑=0.12 *1* (1986Be14). excitation function resonates At several IAR (1967Mo25).
4358.8 *5*				configuration=$\nu 2g_{9/2}\nu 3p^{-1}_{3/2}$. excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=12.0 keV.
4383.2 *5*				β_L: 0.0084 for L=3, 0.0077 for L=4.
4423.6 *5*		6	0.062	L: L=6 confirmed by 1980Ad01, 1977Sc17, 1973Le04. β_L: others: 0.072 (1982Ga02), 0.078 (1980Ad01) 0.057 (1977Sc17), 0.064 (1973Le04), 0.059 (1966Sa10). Γ(P′)=1.7 keV At the $g_{9/2}$ resonance.
4480.7 *5*				configuration=$\nu 2g_{9/2}\nu 3p^{-1}_{3/2}$. excitation function resonates At the $2g_{9/2}$ IAR with Γ(P′)=15.1 keV.
4610.5 *4*		8	0.040	E(level): weighted average of 4610.8 *5* (1997VaZT) and 4610.9 *4* (2007HeZW). Note that In 2001Va04 the value shown is 4609.3 *7*; however, In 1997VaZT, this is the value from (d,p). L: from 1977Sc17. 1975Wa18 and 1973Le04 report L=(8). L=8 confirmed by 1980Ad01. β_L: others: 0.050 (1982Ga02), 0.048 (1980Ad01) 0.040 (1977Sc17), 0.039 (1973Le04), 0.045 (1966Sa10). main excitation is via the $\nu 1j_{15/2}$ IAR (2006He21, 1968Wh02).
4680.3[l] *5*	7$^-$			configuration=$\nu 1i_{11/2}\nu 2f^{-1}_{5/2}$. E(level): 2001Va04 report 4680.7 *5*. L,β_L: 1975Wa18 report L=(9) with β_L=0.016. The evaluator notes that L=7 seems to give a better fit to the authors′ $\sigma(\theta)$ data.
4698.4[l] *3*	3$^-$	3	0.033	configuration=$\nu 1i_{11/2}\nu 2f^{-1}_{5/2}$. E(level): 2001Va04 report 4698.4 *5*. L: L=3 confirmed by 1973Le04. β_L: other: 0.037 (1973Le04). excitation function resonates At $2g_{9/2}$, $1i_{11/2}$, $3d_{5/2}$ IAR (1968Za01, 1968Wh02) with Γ(P′)=5.3 keV ($2g_{9/2}$ IAR), 8.7 keV ($3d_{5/2}$ IAR). %EWSR=2.1 (1985Fu09).
4709.4[l] *8*	5$^-$			configuration=$\nu 1i_{11/2}\nu 2f^{-1}_{5/2}$. E(level): 2001Va04 report 4709.5 *35*.
4711.2[l] *8*	4$^-$			configuration=$\nu 1i_{11/2}\nu 2f^{-1}_{5/2}$.
4761.9[l] *6*	6$^-$	(7)	0.015	configuration=$\nu 1i_{11/2}\nu 2f^{-1}_{5/2}$. E(level): 2001Va04 report 4761.8 *5*. J$^{\pi}$,L: a comparison of J and L indicates a spin-flip excitation.
4833 *2*				
4841.7 *3*		(1)		L: $\sigma(\theta)$ similar to that for the 5291 level (1975Wa18) known to have J$^{\pi}$=1$^-$. β_L: $\beta_L \leq 0.008$ if L=1. main excitation is via the $\nu 3d_{5/2}$ IAR (2006He21).
4860.7 *6*				E(level): weighted average of 4859.8 *15* (2001Va04) and 4860.9 *6* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2006He21).
4867.7 *5*				E(level): weighted average of 4866.9 *15* (2001Va04) and 4867.8 *5* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2006He21).
4894.8 *15*		10	0.036	L,β_L: from 1980Ad01 for E=4882 *15*. 1975Wa18 report L=(10) with B10≈0.027 for E=4895 *2*. main excitation is via the $\nu 1j_{15/2}$ IAR (2006He21).
4910.6 *15*				
4918.9[l] *5*	8$^-$	≥6		configuration=$\nu 1i_{11/2}\nu 2f^{-1}_{5/2}$. E(level): 2001Va04 report 4917.6 *15*.

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	Jπ[&]	L[4]	β_L[7]	Comments
4928.1 *15*		2[w]	0.007[w]	main excitation is via the $\nu 1j_{15/2}$ IAR (assignment is tentative 2006He21).
4937.1 *3*		3[w]	0.018[w]	main excitation is via the $\nu 3d_{5/2}$ IAR (2006He21).
4952.2 *3*		3	0.017	main excitation is via the $\nu 1j_{15/2}$ IAR (the assignment is tentative 2006He21).
4962.9 *15*				
4974.2 *6*		3	0.026	main excitation is via the $\nu 3d_{5/2}$ IAR (2006He21). Γ(P′)=12.6 keV.
4994.7 *6*		≥8		main excitation is via the $\nu 1j_{15/2}$ IAR (assignment is tentative 2006He21).
5010.0 *6*		(9)	0.017	main excitation is via the $\nu 1j_{15/2}$ IAR (assignment is tentative 2006He21).
5037.2 *6*		2[d]	0.007[d]	main excitation is via the $\nu 3d_{5/2}$ IAR (2006He21). Γ(P′)=10.8 keV. L: $\sigma(\theta)$ of 1975Wa18 consistent with L=2, not with L=3 (evaluator). %EWSR=0.28 (1985Fu09).
5056.1				E(level): from (d,p) work of 2006He21. No accurate energy is given for their (p,p′) work. main excitation is via the $\nu 1j_{15/2}$ IAR (2006He21).
5068.5 *15*		10	0.040	L,β_L: from 1980Ad01 for E=5071 *7*. 1975Wa18 report L=(9) with B9=0.017 for E=5072 *3*. Neither of these works would have resolved the 5068.5 and 5074.7 levels; however, E(10^+)=5069.5 In ^{209}Bi(t,αγ), and E(10^+)=5069.38 In ^{207}Pb(d,pγ). On the basis of energy, the 10^+ assignment can Be associated with the 5068.5 (p,p′) level. main excitation is via the $\nu 1j_{15/2}$ IAR (assignment is tentative 2006He21).
5074.7[l] *5*	5^-			configuration=$\nu 1i_{11/2}\nu 3p^{-1}_{3/2}$. E(level): 2001Va04 report 5073.7 *15*.
5079.9[l] *6*	6^-			configuration=$\nu 1i_{11/2}\nu 3p^{-1}_{3/2}$.
5085.3[l] *4*	7^-			configuration=$\nu 1i_{11/2}\nu 3p^{-1}_{3/2}$. E(level): 2001Va04 report 5084.7 *15*.
5087.9 *15*		3	0.033	
5093.4 *6*				E(level): weighted average of 5094.3 *15* (2001Va04) and 5093.2 *6* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2006He21).
5103.3 *15*				
5127.1 *6*				main excitation is via the $\nu 3d_{5/2}$ IAR (2006He21). Γ(P′)=6.7 keV. L,β_L: 1985Fu09 report L=2 with S=0.008. No data are shown. 1975Wa18 do not extract an L value, and their $\sigma(\theta)$ data are not consistent with L=2 (evaluator).
5162.2 *6*				
5194.7 *4*		2	2	E(level): weighted average of 5194.3 *6* (2001Va04) and 5195.0 *6* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2006He21).
5212.8 *15*		2	2	main excitation is via the $\nu 3d_{5/2}$ IAR (2006He21).
5215.6 *15*		2	2	
5235.2 *15*				
5239.6[l] *5*	(4^-)			configuration=$\pi 2f_{7/2}\pi 2d^{-1}_{3/2}$ + $\nu 1i_{11/2}\nu 3p^{-1}_{3/2}$. E(level): 2001Va04 report 5240.8 *15*. Jπ: Proposed by 2006He21 based on the following arguments. The energy is near that of 5162, predicted by the schematic shell model for configuration=$\pi 2f_{7/2}\pi 2d^{-1}_{3/2}$, and the level is selectively excited by the $i_{11/2}$ IAR. These configurations allow J^π=4^- or 5^-. $\sigma(\theta)$ is consistent with 4^-, not with 5^-. The observed excitation In (d,p) indicates a weak admixture of configuration=$\nu 2g_{9/2}\nu 3p^{-1}_{1/2}$ or $\nu 2g_{7/2}\nu 3p^{-1}_{1/2}$.
5244.6 *10*		3[d]	0.021[d]	E(level): given As 5245.6 *15* In 1997VaZT. main excitation is via the $\nu 3d_{5/2}$ IAR (2006He21, 1967Mo25). L: $\sigma(\theta)$ of 1975Wa18 consistent with L=3 (evaluator). %EWSR=1.4 (1985Fu09).
5276.5[l] *5*	4^-	3	0.013	configuration=$\nu 1i_{11/2}\nu 3p^{-1}_{3/2}$. E(level): 2001Va04 report 5277.1 *15*. Jπ,L: a comparison of J and L indicates a spin-flip excitation.
5281.3 *15*				main excitation is via the $\nu 4s_{1/2}$ IAR (2006He21).
5287.2 *15*				
5292.6 *15*				main excitation is via the $\nu 4s_{1/2}$ IAR (2006He21). Γ(P′)=5.1 keV.
5317.7[i] *6*				
5326.7[i] *4*				E(level): weighted average of 5326.9 *6* (2001Va04) and 5326.6 *6* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW).

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	Jπ[&]	L[4]	β_L[7]	Comments
5339.6 *5*				E(level): weighted average of 5340.1 *15* (2001Va04) and 5339.6 *5* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW).
5348.4 *6*		3	0.035	L: L=3 confirmed by 1985Fu09. excitation function resonates At several IAR (1967Mo25) with Γ(P′)=1.7 keV ($3d_{5/2}$ IAR). %EWSR=3.7 (1985Fu09).
5364 *3*				
5373.6 *7*		5	0.016	E(level): weighted average of 5373.9 *15* (2001Va04) and 5373.6 *7* (2007HeZW). Jπ: π=+ from the observed. main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW).
5384.2 *6*				Γ(P′)=3.6 keV ($3d_{5/2}$ IAR).
5401 *2*				
5418.6 *5*		(6),(7)	0.015,0.016	
5482.4[e] *5*		5	0.045	L: L=5 confirmed by 1985Fu09. excitation function resonates At the $3d_{5/2}$ IAR (1967Mo25).
5492.2[e] *5*				
5502[e] *3*				
5511.9[eh] *15*				
5516.9[eh] *15*				%EWSR=1.8 (1985Fu09).
5524 *3*				
5529 *3*				
5536.7 *9*		*f*	*f*	E(level): weighted average of 5536.9 *15* (2001Va04) and 5536.7 *9* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW).
5543.3 *15*		*f*	*f*	
5547.5 *15*		*f*	*f*	
5554 *2*				
5564.7 *6*		2	0.017	E(level): In 1997VaZT this value is given As being from (d,p). The (p,p′) value is given As 5563.9 *15*.
5576.6 *15*				
5587.7 *5*				
5599.6 *4*				
5615.2 *3*	7^+	≥6		E(level): weighted average of 5615.4 *4* (2001Va04) and 5614.8 *5* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW). Jπ: from 2007HeZW.
5639.9 *15*				
5643.1 *15*				
5649.2 *5*				E(level): weighted average of 5649.8 *9* (2001Va04) and 5649.0 *6* (2007HeZW). main excitation is via the $\nu 2g_{9/2}$ IAR (2007HeZW).
5649.5 *4*				E(level): from 2007HeZW. main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW).
5658.8 *25*		5	0.022	
5666.4 *15*				
5675.3 *4*		(3)	0.016	
5685.6 *8*				E(level): weakly excited state (priv comm from A. Heusler).
5686.5 *7*	6^-			E(level): weighted average of 5686.2 *15* (2001Va04) and 5686.6 *7* (2007HeZW). main excitation is via the $\nu 2g_{9/2}$ IAR (2007HeZW).
5690.2 *15*		4	0.045	L: L=4 confirmed by 1985Fu09.
5695.0 *9*	7^-			E(level): weighted average of 5694.8 *15* (2001Va04) and 5695.1 *10* (2007HeZW). main excitation is via the $\nu 2g_{9/2}$ IAR (2007HeZW).
5715.2 *15*				
5721.8 *4*		(7)	0.027	excitation function resonates At the $3d_{5/2}$ IAR (1967Mo25).
5738.4[j] *8*				
5741.2 *4*		(9)	0.019	E(level): weighted average of 5741.1 *4* (2001Va04) and 5741.8 *9* (2007HeZW). main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW).
5749.7 *4*				

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	Jπ[&]	L[4]	β_L[7]	Comments
5763.7[j] *8*		6	0.013	main excitation is via the $\nu 1j_{15/2}$ IAR (2007HeZW).
5778.1 *4*				excitation function resonates At the $3d_{5/2}$ IAR (1967Mo25).
5799.9[j] *8*				
5804.9 *15*				
5813.4 *4*		3	0.028	excitation function resonates At the $3d_{5/2}$, $3d_{3/2}$ IAR.
5823.9 *15*				
5835.9 *6*	8^-			E(level): weighted average of 5836.0 *8* (2001Va04) and 5835.7 *9* (2007HeZW). main excitation is via the $\nu 2g_{9/2}$ IAR (2007HeZW).
5844.8 *15*	(1^+)			Jπ: p(θ) for 5845 level is consistent with $J^\pi=1^+$ (1987Ta08). from DWBA analysis of 65-MeV (p,p′), 1984Fu06 conclude that this level is not pure isovector but is predominantly isoscalar. 1984Dj03, from an analysis of 201-MeV (p,p′), reach the same conclusion, As do 1987Ta08 from the similarity of the measured strengths In 45-MeV (p,p′) and 45-MeV (d,d′).
5873.4 *4*		3[d]	0.008[d]	1975Wa18 report L=(3), β_3=0.015 and state that this peak is a possible multiplet. excitation function resonates At the $3d_{5/2}$, $2g_{7/2}$ IAR with Γ(P′)=12.7 keV ($3d_{5/2}$ IAR). %EWSR=0.25 (1985Fu09).
5884.8 *4*				
5900 *3*		(8)	0.016	E(level): In 1997VaZT the energy of this level is given As 5895 *3*.
5919 *2*				
5922.3 *15*				excitation function resonates At the $3d_{3/2}$ IAR.
5945.3 *6*				excitation function resonates At the $3d_{3/2}$ IAR.
5967.8 *8*		≈9	≈0.027	excitation function resonates At the $2g_{7/2}$ IAR.
5988.7 *15*				
5994.9 *15*		6	0.049	excitation function of unresolved 5995+6010 levels resonates At $3d_{5/2}$, $2g_{7/2}$ IAR.
6009.6 *6*		3	0.027	excitation function of unresolved 5995+6010 levels resonates At the $3d_{5/2}$, $2g_{7/2}$ IAR.
6020.4 *20*				
6025.1 *20*				
6033 *2*				
6037.8 *15*				
6053.7 *6*		4	0.015	
6068.6 *15*				
6077.7 *15*		3	3	
6086.7 *6*		3	3	
6098.9 *15*				
6100 *8*	12^+[v]		0.021	configuration=$\nu 1i_{11/2}\nu 1i_{13/2}^{-1}$. E(level),L,$\beta_L$: E is from 1990Fu07. S is from 1980Ad01 for E=6076 *23*. E(12^+)=6100.8 from (x,x′γ). 2001Va04 indicate the 12^+ state As being different from their close-lying 6098.9 and 6101.9 levels.
6101.9 *15*				
6191.0 *15*		*x*	*x*	
6193.5 *15*		*x*	*x*	
6216.8 *15*				
6223.9 *15*				
6234.9 *6*				
6243.4 *6*		*m*	*m*	
6250.6 *15*		*m*	*m*	
6255.5 *15*				
6263.8 *6*		(1)		L: σ(θ) similar to that for the 5291 level (1975Wa18), known to have $J^\pi=1^-$. σ(θ) consistent with calculation for a mixed isovector+isoscalar excitation (1978Mo04).
6274.9 *15*		3[g]	0.018[g]	
6278.4 *15*		*g*	*g*	
6315.0 *15*		*t*	*t*	
6317.6 *15*		*t*	*t*	
6327.2 *15*		*u*	*u*	
6332.9 *15*		*u*	*u*	

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	Jπ[&]	L[4]	β_L[7]	Comments
6337.6 *6*		*u*	*u*	
6348.3 *15*				
6354.3 *6*				
6361.5 *15*				
6371.8 *15*		*n*	*n*	
6378.8 *6*		*n*	*n*	
6389.8 *15*		*n*	*n*	
6397.1 *15*				
6418.8 *6*				
6425[#] *7*	[#]			
6427.6 *15*				
6435.8 *15*				
6437[#] *7*	12^{-}[#]			configuration=$\nu 1j_{15/2}\nu 1i^{-1}_{13/2}$.
6443.8 *6*		3[d]	0.008[d]	L,β_L: 1975Wa18 report L=7, β_7=0.024 for a probable multiplet structure At E=6443 *6*. %EWSR=0.29 (1985Fu09). excitation function resonates At the $3d_{3/2}+2g_{7/2}$ IAR (1967Mo25).
6450[#] *7*	[#]			
6451.5 *6*				
6462.3 *6*				
6472.6 *6*				
6482.0 *15*				
6486.1 *15*				
6500 *2*				
6512.8 *6*				
6529.0 *15*		*y*	*y*	
6531.7 *15*		*y*	*y*	
6541.6 *6*				
6552.2 *6*				
6561.0 *15*				
6570 *2*				
6579.0				
6589.0 *15*				
6595.9 *15*				
6609.2 *15*				
6616.2 *6*		3,4	0.023,0.026	excitation function resonates At the $2g_{7/2}$ IAR.
6631.5 *6*				
6655.3 *15*				
6659.2 *15*		4	0.023	
6683.0 *15*				
6689.1 *15*		5	0.041	excitation function resonates At the $2g_{7/2}$ IAR (1968Wh02).
6699.9 *15*		*o*	*o*	
6708.9 *15*		*o*	*o*	
6719.7 *7*		(1)		L: $\sigma(\theta)$ consistent with calculation for an isovector dipole excitation (1978Mo04).
6728 *2*				
6733.3 *15*		*p*	*p*	
6736 *8*	14^{-}[v]			configuration=$\nu 1j_{15/2}\nu 1i^{-1}_{13/2}$. E(level): from 1990Fu07. E=6743.6 is reported In (x,x′γ). This level is different from the adjacent close-lying levels reported In 1997VaZT since levels with such a high spin would not Be seen In that work.
6739.6 *7*		*p*	*p*	
6756.4 *7*				
6768 *2*				
6777.0 *7*				
6787.1 *15*				
6794.1 *15*				

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	Jπ[&]	L[4]	β_L[7]	Comments
6801.0 *7*				excitation function resonates At the $3d_{3/2}+2g_{7/2}$ IAR (1967Mo25).
6821.0 *15*				
6825.8 *15*				
6831.5 *15*				
6845.7 *6*		(8)	0.021	
6861.4 *6*				
6868.0 *6*				
6877.9 *6*				excitation function resonates At the $3d_{3/2}+2g_{7/2}$ IAR (1968Wh02).
6897.2 *6*				
6917.5 *6*		*z*	*z*	
6929.1 *6*		*z*	*z*	
6939.9 *15*		3[d]	0.008[d]	%EWSR=0.27 (1985Fu09).
6947 *2*				E(level): the uncertainty In the authors′ quoted value of 6947 *15* is probably a misprint. The evaluator assigns ΔE=2 keV.
6969.5 *6*		(1)		L: $\sigma(\theta)$ similar to that for the 5291 level (1975Wa18) known to have $J^\pi=1^-$.
6988.7 *15*		1	1	
6995.1 *15*		1	1	
7001.2 *15*				
7020.1 *3*		(3)	0.021	
7034 *2*				
7057 *8*	12^{-}[v]			configuration=$\nu 1i_{13/2}\nu 2h^{-1}_{11/2}$. E(level): from 1990Fu07. This level is different from the 7057.9 level reported by 2001Va04 since a level with such a high spin would not Be seen In that work.
7057.9 *15*				
7063.4 *15*				
7082.2 *15*		(1)		L: $\sigma(\theta)$ consistent with calculation for an isovector dipole excitation (1978Mo04).
7095.6 *3*				
7117.0 *3*		(3)	0.020	
7137.8 *15*				
7148 *2*				
7157 *2*				
7166 *2*		*c*	*c*	
7177.0 *3*		*c*	*c*	
7191.6 *15*		*b*	*b*	
7196.6 *15*		*b*	*b*	
7218 *2*				
7232.2 *15*				
7237.9 *15*	1			L: $\sigma(\theta)$ for E=7239 *5* is similar to that for the 5291 level level (1975Wa18) known to have $J^\pi=1^-$; however, 1978Mo04 indicate that $\sigma(\theta)$ is fit better by a microscopic M1 calculation, giving $J^\pi=1^+$.
7255 *3*				
7265.9 *15*		2[d]	0.008[d]	%EWSR=0.62 (1985Fu09).
7278.8 *15*		*q*	*q*	
7293.7 *15*		*q*	*q*	
7302.4 *15*				L,β_L: 1975Wa18 report L=5, β_5=0.018 for a probable multiplet structure At 7302 *8*. 1985Fu09 report L=2, β_2=0.008 with %EWSR=0.74 for E=7301.
7316 *8*		2[d]	0.011[d]	E(level): from 1976Fr21. 1985Fu09 report E=7320. The level is not reported by 1975Wa18 or 1997VaZT. %EWSR=1.06 (1985Fu09).
7326.5 *15*		(1)		L: $\sigma(\theta)$ consistent with calculation for an isovector dipole excitation (1978Mo04).
7334.8 *15*		3[d]	0.017[d]	%EWSR=1.20 (1985Fu09).
7346 *3*				
7360[k] *50*		2[k]		Γ=400 *50* keV, %EWSR=6.5 *1* (1986Be14).
7361 *3*				

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	Jπ[&]	L[4]	β_L[7]	Comments
7369.8 *15*				
7389 *2*				E(level),L,β_L: 1975Wa18 report a level At 7382 *9* with L=(4) and β_4=0.016.
7400.1 *15*		*r*	*r*	
7408.5 *15*		*r*	*r*	
7420.8 *15*				
7428.9 *15*				
7448 *2*		*s*	*s*	
7460 *8*	$(11^+)^v$			configuration=$\nu 1j_{15/2}\nu 1i^{-1}_{13/2}$. E(level),Jπ: from 1990Fu07. The level is a multiplet so the Jπ assignment is not definite. If the Jπ assignment is correct, this level must Be different from the 7460 or 7469.3 levels reported by 2001Va04 since a level with such a high spin would not Be seen In that work.
7460 *2*		*s*	*s*	
7469.3 *15*		*s*	*s*	
7491		2^d	0.011[d]	E(level): from 1985Fu09. Not reported by 1975Wa18 or 1997VaZT. %EWSR=1.03 (1985Fu09).
7505.0 *3*				
7517		3^d	0.014[d]	E(level): from 1985Fu09. Not reported by 1975Wa18. %EWSR=0.87 (1985Fu09).
7549 *8*				
7573 *7*				
7594[#] *7*	#			
7656 *8*	$(10^+)^v$			configuration=$\nu 2g_{7/2}\nu 1i^{-1}_{13/2}$. E(level),Jπ: from 1990Fu07. The authors point out that the $\sigma(\theta)$ fit is good, but the lack of data At forward angles prevents a definite assignment.
7684 *9*				
7723 *8*				
7825 *8*	10^{-v}			configuration=$\nu 1i_{11/2}\nu 2h^{-1}_{9/2}$. E(level): from 1990Fu07.
7840[k] *50*		2^k		Γ=400 *50* keV, %EWSR=4.2 *6* (1986Be14).
7920[@]		1^a		
8010[@]				
8110[k] *50*		4^k		Γ=400 keV *50*, %EWSR=3.0 *15* (1986Be14).
8166 *8*		3^a		%EWSR(isoscalar)=2.4 (1978Mo04).
8220[@]		1^a		
8350[k] *50*		3^k		Γ=400 keV *50*, %EWSR=4.0 *12* (1986Be14).
8369 *8*	12^{+v}			configuration=$\nu 1j_{15/2}\nu 2h^{-1}_{9/2}$. E(level): from 1990Fu07.
8370[@]		1^a		
8470[@]		3^a		%EWSR(isoscalar)=1.0 (1978Mo04).
8620[@]		2^a		%EWSR(isoscalar)=1.6 (1978Mo04).
8750[@]		2^a		%EWSR(isoscalar)=1.8 (1978Mo04).
8830[@]		3^a		%EWSR=0.8 (1978Mo04).
8860[k] *50*		2^k		Γ=400 keV *50*, %EWSR=7 *1*.
8950[@]		2^a		%EWSR(isoscalar)=1.4 (1978Mo04).
9.17×10[3]6 *10*		2^6		Γ=1.0 MeV. %EWSR=12 *3* (1986Ad02). 1982Dj01 report E=9000 with Γ=1.0 MeV. 1986Mc06 report E=8900 *600* with Γ=1.2 MeV *6* and %EWSR=8 *5*. configuration=isoscalar giant quadrupole resonance.
9180[@]		3^a		%EWSR(isoscalar)=1.1 (1978Mo04).
9310[@]		2^a		%EWSR=1.7 (1978Mo04).
9340[k] *50*		2^k		Γ=400 keV *50*, %EWSR=5.0 *8*.

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

E(level)[†‡]	L[4]	Comments
9380[@]	1+3[a]	%EWSR(isoscalar)=1.3 for L=1 (1978Mo04).
9520[@]	2[a]	%EWSR(isoscalar)=2.1 (1978Mo04).
10.71×10^3 6 *10*	2 6	Γ=1.9 MeV, %EWSR=47 *7* (1986Ad02). 19986mc06 report E=10600 *500* with Γ=2.4 MeV *6* and %EWSR=65 *15*. 1982Dj01 report E=10600 with Γ=2.0 MeV *2*. 1986Be14 report E=10600 *200* with Γ=2.0 MeV *2* and %EWSR=70 *14*.
12.0×10^3[k] *3*	4[k]	Γ=2.4 MeV *2*, %EWSR=10 *3* (1986Be14) 1986Mc06 report 12000 *700* with Γ=2.5 MeV *10* and %EWSR=8 *3*.
13500 5	1	E(level): from 1982Dj01. Γ=3.6 MeV (1982Dj01). configuration=low−energy component of the isoscalar giant dipole resonance.
13900	0	E(level): from 1982Dj01. Γ=2.60 MeV *15* (1982Dj01). configuration=isoscalar giant monople resonance.
20.9×10^3 *10*	3	E(level),L: from 1986Mc06. Γ=5.9 MeV, %EWSR=36 *12* (1986Mc06). 1982Dj01 report E=17600 with Γ≈5 MeV. 1980Ca14 report E=19.1 MeV *10* with Γ=5.3 MeV *8* and %EWSR=20 *6*. 1986Ad02 report E=19800 *200* with Γ=7.1 MeV, %EWSR=50 *12*.
22.6×10^3 6 *2*	1 6	Γ=6.1 MeV, %EWSR=44 *11*. 1982Dj01 report E=21500 *200* with Γ=5.7 MeV *2*. configuration=high−energy component of the isoscalar giant dipole resonance.

† Except where noted otherwise, the excitation energies up to 6102 are from 2001Va04. Values for higher levels up to 7505 are from 1997VaZT, and higher values yet are from 1975Wa18. The higher-energy unpublished data of 1997VaZT should Be considered As preliminary In that they have not been fully evaluated and compared with the authors′ (α,α') and (d,p) data. In addition to the fine structure peaks observed by 1978Mo04 In the region 8.6-9.4 MeV, 1997Ka17 report prominent peaks At about 8.9, 9.4, 9.6, 10.1, and 10.7 MeV. These peaks are also seen by the authors In their (e,e′) work. 1994Va34 find No evidence for the 5683 level reported by 1992Wo09 and proposed by them to Be the 4^+ or 6^+ member of the two phonon- vibrational multiplet.

‡ In addition to the levels listed here, 1975Wa18 report peaks At 4106, 4141 with L=(2), 4159, 4403, 4444 with L=(5), 4463, 4577, 5444, and 6170 with L=2. These levels have not been confirmed by 2001Va04 (or 1997VaZT), or by 2006He21 (priv comm from A. Heusler).

1980Ba46 report $J^\pi=12^-$ for a peak At 6420, and 1990Fu07 report a 12^- peak At 6440. Both authors base their assignment on the agreement of the experimental $\sigma(\theta)$ with calculations for a state with particle-hole configuration $\nu 1j_{15/2}\nu 1i_{13/2}^{-1}$ and the agreement between the experimental energy and the expected energy for that configuration. In a separate run with resolution 12 keV At E(p)=65 MeV, 1990Fu07 resolve their 6440 peak into three components, with energies 6425 *7*, 6437 *7*, and 6450 *7*. They point out that shell-model calculations give a quartet of states At E≈6400 with configuration=$\nu 1j_{15/2}\nu 1i_{13/2}^{-1}$ with $J^\pi=10^-$, 11^-, 12^-, and 13^-. The 6437 level agrees In energy with the 6437 level with $J^\pi=12^-$ seen In (e,e′), and both the 6437 and 6450 levels agree In energy with levels seen In (x,x′γ) and proposed As having $J^\pi=12^-$ and 13^-, respectively. The agreement In energy of these three levels with close-lying levels In the work of 2001Va04 is probably coincidental, since levels with such high spins are not expected to Be populated In that work.

@ From 1978Mo04.

& Except where noted otherwise, the J^π values are from 2006He21 based on a comparison of the experimental $\sigma(\theta)$ values and cross-sections with calculations based on the schematic shell model. The cross-sections are averaged values for the members of the $\nu 1i_{11/2}\nu 2f_{5/2}^{-1}$ multiplet and for members of the $\nu 1i_{11/2}\nu 3p_{3/2}^{-1}$ multiplet. See 2006He21 for details. the same arguments hold for the 5686, 5695 and 5835 levels which have configuration=$\nu 2g_{9/2}\nu 2f_{7/2}^{-1}$. Note that the energy of the third of these levels is given incorrectly As 5935 In 2006He21 (priv comm from A. Heusler).

[a] From 1978Mo04.

[b] 1975Wa18 report L=(4) with β_L=0.022 for E=7192 *6*.

[c] 1985Fu09 report L=3 with β_3=0.007 and %EWSR=0.23 for E=7171.

[d] From 1985Fu09. The authors quote β_LR. The β_L values are extracted using R=7.11.

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^{208}Pb(p,p′),(pol p,p′) (continued)

^{208}Pb Levels (continued)

[e] Γ(P′)=17.7($3d_{5/2}$ IAR) for unresolved levels In the range E=5482 to 5517.
[f] 1975Wa18 report L=3 and β_3=0.032 for E=5542 *4*.
[g] 1985Fu09 report L=3 with β_3=0.018 and %EWSR=0.13 for E=6276.
[h] 1975Wa18 report L=1 and 3, β_3=0.038 for E=5514 *4* and state that this peak is a probable multiplet. 1985Fu09 report L=3 with β_3=0.024 and %EWSR=1.8 for E=5515. The excitation function resonates At $4s_{1/2}$ IAR (1967Mo25).
[i] 1975Wa18 report L=3 with β_3=0.017 for E=5321 *4*. 1985Fu09 report %EWSR=0.17.
[j] In 1997VaZT this level is stated As being from (d,d′). No (p,p′) value is given.
[k] From 1986Be14.
[l] From 2006He21.
[m] 1975Wa18 report L=(7) with β_7=0.029 for E=6248 *5*.
[n] 1975Wa18 report L≈7 with β_7≈0.020 for a probable multiplet structure At E=6381 *6*. The excitation function resonates At the $2g_{7/2}$ IAR.
[o] 1985Fu09 report L=3 with β_3=0.014 and %EWSR=0.75 for E=6704.
[p] 1975Wa18 report L=3 with β_3=0.007 for E=6737 *5*. 1985Fu09 report %EWSR=0.23. The excitation function resonates At the $3d_{3/2}+2g_{9/2}$ IAR.
[q] 1985Fu09 report L=2 with β_2=0.008 and %EWSR=0.62 for E=7287.
[r] 1975Wa18 report L=1 for E=7404 *2*, and 1978Mo04 report L=1 for E=7400.
[s] 1985Fu09 report L=2 with β_2=0.011 and %EWSR=1.14 for E=7455.
[t] 1975Wa18 report L=(3) with β_3=0.015 for E=6314 *5*. The excitation function resonates At the $4s_{1/2}$ IAR.
[u] 1975Wa18 report L=6 with β_6=0.025 for E=6332 *6*.
[v] From 1990Fu07 based on comparison of $\sigma(\theta)$ with DWBA calculations for the indicated pure particle-hole configuration, and agreement of excitation energy with the calculated value. The J^π and configuration agree with earlier work of 1980Ad01 for the 6100 level, and of 1980Ba46 for the 6736, and 7057 levels.
[w] 1975Wa18 report L=4 with β_4=0.024 for E=4933 *3*. 1985Fu09 report L=2 with β_2=0.007 and %EWSR=0.33 for E=4923, and L=3 with β_3=0.018 and %EWSR=0.90 for E=4934. The excitation function for one or both of these states resonates At the $1i_{13/2}$ IAR (1968Wh02). L(α,α')=3 for E=4937 confirms $J^\pi=3^-$ for that level. The evaluator notes that the $\sigma(\theta)$ data of 1975Wa18 for their 4933 level seems to Be fit As well with L=3 as with L=4.
[x] 1975Wa18 report L=3, with β_3=0.020 for E=6191 *5*.
[y] 1975Wa18 report L=(5) with β_5= 0.026 for a probable multiplet structure At E=6529 *6*.
[z] 1975Wa18 report L=4 with β_4=0.020 for a probable multiplet structure At 6925 *6*.
[1] 1975Wa18 report L=(3) with β_3=0.019 for E=6992 *6*.
[2] 1975Wa18 report multiplet structure At 5194 *4*, and extract L=3 with β_3=0.016 for the apparently dominant member. No multiplet is seen by 1997VaZT. 1973Le04 report L=4,3 with β_L=0.032,0.028 for E=5205 *15*.
[3] 1985Fu09 report L=2 with β_2=0.007 and %EWSR=0.41 for E=6082. 1975Wa18 report E=6082 *5*. The excitation function for the 6078 and/or the 6087 level resonates At the $3d_{3/2}$ IAR.
[4] From 1975Wa18, except where noted otherwise. For L≥7, the assignments are tentative. Values from other references are given In comments.
[5] 1986Mc06 report E=14000 *600*, Γ=3.4 *8* MeV, and %EWSR=100 *30* for the combined L=1 and L=0 peaks.
[6] From 1986Ad02.
[7] Data are β_L of 1975Wa18. See 1977Sc17 for a discussion of a possible calculational error In the data of 1975Wa18. Values from other references are given In comments, along with %EWSR values from 1985Fu09 for some levels with L=2 and 3. See also 1987Mc03 for a summary of deformation lengths and an extraction of neutron- to-proton transition multipole moments for several low-lying levels.