^{31}P(p,α):resonances 1967Ri07,1960Cl02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Christian Ouellet, Balraj Singh	NDS 112, 2199 (2011)	24-Aug-2011

$J^\pi(^{31}\text{P g.s.})=1/2^+$.

Includes ^{1}H(^{31}P,α) from 2011Mo12.

2011Mo12: ^{1}H(^{31}P,α), inverse kinematics. Beam=^{31}P at 19.78, 19.80, 19.845 and 19.875 keV. Target=hydrogen. Measured particle spectra, SIDAR detector Deduced resonance strengths ($\omega\gamma$) for 600- and 622-keV proton resonances.

1988Fa01: 1.00-4.01 MeV protons from the KN Van de Graaff accelerator at TUNL. Zn_3P_2 targets. Measured excitation functions and used R-matrix analysis to determine spins.

1973Sh07: blocking technique used to investigate lifetime of one level (642 keV).

1967Ve05: 1.4-1.9 MeV protons from the Van de Graaff accelerator at Laboratoire Joliot-Curie. Zn_3P_2 targets. Surface barrier detectors. Measured angular distributions, yields and widths.

1967Ri07: 1-5.5 MeV protons from the University of Texas KN 4MV accelerator, E=1-3.1 MeV protons from Chalk River accelerator. Natural red phosphorus targets. Surface barrier detectors in a scattering chamber for angular distribution measurements, widths and yields.

1963Ku24: 0.87 MeV protons from the Utrecht Cockroft-Walton generator. Zn_3P_2 targets. Surface barrier Si detectors. Measured alpha spectra, widths, yields and angular distributions.

1960Cl02: 3 MeV protons from Chalk River electrostatic accelerator. Double focusing magnetic spectrometer and scintillation counter (KI and CsI). Zn_3P_2 targets. Measured α spectra and and yields for resonance strength.

Other: 1969Ka12.

^{32}S Levels

E(level)†	Jπ‡	$T_{1/2}$‡	$(2J+1)\Gamma_\alpha\Gamma_p/\Gamma$ (eV)‡	Comments
9208			<0.03#	E(level): E(p)=355 (1963Ku24).
9236			<0.03#	E(level): E(p)=384 (1963Ku24).
9289			<0.04#	E(level): E(p)=439 (1963Ku24).
9388			<0.04#	E(level): E(p)=541 (1963Ku24).
9464	(2^+,3^-)	3.1 eV	0.10#	E(level): E(p)=618.7 *9* (1963Ku24). Resonance Strength $\omega\gamma$=0.022 eV *7* (2011Mo12). $T_{1/2}$,J^π: from 1963Ku24. A_2=+1.22 *8*, A_4=+1.32 *45*.
9485	1^-	8.2 eV *25*	5.4#	E(level): E(p)=641 (1963Ku24), 642 (1973Sh07). Resonance Strength $\omega\gamma$=0.99 eV *8* (2011Mo12). J^π: from 1963Ku24. $T_{1/2}$: from 1973Sh07. A_2=+0.61 *5*.
9651			<0.12#	E(level): E(p)=812 (1963Ku24).
9658		8.2 eV *25*	<0.26#	E(level): E(p)=820 (1963Ku24).
9856 *10*	1	0.8 keV	5.0	E(level): E(p)=1024 *10* (1960Cl02), 1024 (1967Ri07). Additional information 1.
9988 *10*		≈4 keV		E(level): E(p)=1161 *10* (1960Cl02). $T_{1/2}$: from 1960Cl02.
10075				E(level): E(p)=1250 (1988Fa01).
10223 *6*	2,3	1.8 keV	11	E(level): E(p)=1403 (1988Fa01), 1403 *6* (1967Ve05), 1404 *10* (1960Cl02), 1404 (1967Ri07). Additional information 2.
10257				E(level): E(p)=1438 (1988Fa01).
10288 *6*	3			E(level): E(p)=1470 *6* (1967Ve05). J^π: from (1967Ve05). Additional information 3.
10294 *6*	3	1.3 keV	16	E(level): E(p)=1476 *6* (1967Ve05), 1474 *10* (1960Cl02), 1474 (1967Ri07).

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^{31}P(p,α):resonances 1967Ri07,1960Cl02 (continued)

^{32}S Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$‡	(2J+1)$\Gamma_\alpha\Gamma_p/\Gamma$ (eV)‡	Comments
				Jπ: 1976Ri02 disagrees with J=2 (1967Ve05). Additional information 4.
10331 *6*	1	8.3 keV	690	E(level): E(p)=1514 *6* (1967Ve05), 1514 *10* (1960Cl02), 1514 (1967Ri07). Additional information 5.
10372				E(level): E(p)=1557 (1988Fa01).
10398				E(level): E(p)=1583 (1988Fa01).
10456 *6*	0,1	2.9 keV	40	E(level): E(p)=1643 *6* (1967Ve05), 1640 *10* (1960Cl02), 1640 (1967Ri07). Additional information 6.
10525 *6*	2	1.8 keV	26.5	E(level): E(p)=1715 *6* (1967Ve05), 1710 *10* (1960Cl02), 1710 (1967Ri07). Additional information 7.
10624 *6*	(3)	3.1 keV	16	E(level): E(p)=1817 *6* (1967Ve05), 1811 *10* (1960Cl02), 1811 (1967Ri07). Additional information 8.
10701 *6*	1	20 keV	1100	E(level): E(p)=1896 *6* (1967Ve05), 1892 *10* (1960Cl02), 1892 (1967Ri07). Jπ: from 1967Ve05. Additional information 9.
10778 *10*	2,(1)	4.4 keV	65	E(level): E(p)=1976 *10* (1960Cl02), 1976 (1967Ri07). Additional information 10.
10791 *10*	1	≤3 keV	38	E(level): E(p)=1989 (1988Fa01), 1990 *10* (1960Cl02), 1990 (1967Ri07). Additional information 11.
10823 *10*	1	≈6 keV	68	E(level): E(p)=2022 (1988Fa01), 2018 *10* (1960Cl02), 2018 (1967Ri07). Additional information 12.
10824				E(level): E(p)=2023 (1988Fa01).
10830 *3*		≈4 keV		E(level): E(p)=2029 *3* (1960Cl02), 2029 (1967Ri07). Additional information 13.
10832 *3*	2,(3)	≈2.5 keV	54	E(level): E(p)=2031 *3* (1960Cl02), 2031 (1967Ri07). Additional information 14.
10841 *10*		≈0.4 keV		E(level): E(p)=2041 *10* (1960Cl02), 2041 (1967Ri07). Additional information 15.
10907 *10*	1	2.1 keV	21	E(level): E(p)=2109 *10* (1960Cl02), 2109 (1967Ri07). Additional information 16.
10977				E(level): E(p)=2181 (1988Fa01).
11092				E(level): E(p)=2300 (1988Fa01).
11222 *10*	1	9 keV	220	E(level): E(p)=2434 *10* (1960Cl02), 2434 (1967Ri07). Additional information 17.
11425 *10*	1	≈4 keV	29	E(level): E(p)=2644 *10* (1960Cl02), 2644 (1967Ri07). Additional information 18.
11556 *10*	(0,1)	6.1 keV	122	E(level): E(p)=2779 *10* (1960Cl02), 2799 (1967Ri07). Additional information 19.
11581 *10*	1	10.7 keV	212	E(level): E(p)=2805 *10* (1960Cl02), 2805 (1967Ri07). Additional information 20.
11648 *10*	1	6.6 keV	130	E(level): E(p)=2874 *10* (1960Cl02), 2874 (1967Ri07). Additional information 21.
11695 *10*	(2)	8.0 keV	250	E(level): E(p)=2922 *10* (1960Cl02), 2922 (1967Ri07). Additional information 22.
11778 *10*	2,(1)	30 keV	1000	E(level): E(p)=3008 *10* (1960Cl02), 3008 (1967Ri07). Additional information 23.
11886 *10*	1	7.6 keV	250	E(level): E(p)=3119 *10* (1960Cl02), 3119 (1967Ri07). Additional information 24.
11938	3	7.3 keV	59	E(level): E(p)=3173 (1967Ri07).
11988	2	11.8 keV	620	E(level): E(p)=3254 (1967Ri07).

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^{31}P(p,α):resonances 1967Ri07,1960Cl02 (continued)

^{32}S Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$[‡]	(2J+1)$\Gamma_\alpha\Gamma_p/\Gamma$ (eV)[‡]	Comments
12124	2	6.9 keV	550	E(level): E(p)=3394 (1967Ri07).
12163	(3,2)	22 keV	300	E(level): E(p)=3434 (1967Ri07).
12270	0	21 keV	600	E(level): E(p)=3545 (1967Ri07).
12362	3,(2)	4.8 keV	170	E(level): E(p)=3640 (1967Ri07).
12395	3	7.7 keV	110	E(level): E(p)=3674 (1967Ri07).
12430	3,2	13.9 keV	200	E(level): E(p)=3710 (1967Ri07).
12486	2	7.8 keV	86	E(level): E(p)=3768 (1967Ri07).
12513	(2,1)	18.6 keV	290	E(level): E(p)=3796 (1967Ri07).
12553	2	8.4 keV	45	E(level): E(p)=3837 (1967Ri07).
12568	2	3.0 keV	90	E(level): E(p)=3853 (1967Ri07).
12600	3,2	7.9 keV	93	E(level): E(p)=3886 (1967Ri07).
13368	3	10.5 keV	670	E(level): E(p)=4678 (1967Ri07).

[†] Levels below 11988 keV list the author's E(p) however the evaluator believes their Texas measurements suffer from a 29 keV offset, as their AECL measurements agree well with other groups. E(p) quoted is their data without modification, however the excitation energy has the 29 keV offset removed. All other levels are derived from the most precise E(p) listed using E=E(p)(c.m.)+S(p) where S(p)=8863.96 keV *1* (2003Au03).

[‡] From 1967Ri07, unless otherwise noted.

[#] From 1963Ku24.