^{37}Cl(p,p′γ),(p,p) 1986La10,1969Du08

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	John Cameron, Jun Chen and Balraj Singh, Ninel Nica	NDS 113, 365 (2012)	15-Jan-2012

1986La10: ^{37}Cl(p,p′γ), E=6 MeV and (α,α′γ), E=12 MeV protons produced from the 5.5 MV van de Graaff accelerator. Targets of enriched $BaCl_2$ (98.6% ^{37}Cl). A 99.7-cm^3 Ge(Li) detector for detecting γ-rays and two silicon surface barrier detectors for detecting protons. Measured Eγ, Iγ, γ(θ), σ(E_p). Deduced levels, J^π, branchings, mixing ratios, $T_{1/2}$ using Doppler Shift Attenuation Method (DSAM).

1969Du08: ^{37}Cl(p,p′γ), E=4.6-6.2 MeV 0.05 μA proton beam. Thin targets of $CdCl_2$ (99.28% ^{37}Cl), 100 μg/cm^2. A 300 and a 390 μm annular surface-barrier detectors for detecting protons, FWHM=24 keV; a 7.62 by 7.62-cm-diam NaI(Tl) crystal and 15- and 35-cc Ge(Li) for detecting. Measured σ(E_p,θ), Eγ, Iγ, pγ(θ)-coin. Deduced levels, J^π, branchings, mixing ratios, half-lives using Doppler Shift Attenuation Method (DSAM).

1972Br45: ^{37}Cl(p,p′γ) E=3.45-6.00 MeV protons produced from the University of Auckland folded tandem accelerator. Natural chlorine targets of AgCl, $PbCl_2$ and solid Cl (75.77% ^{35}Cl, 24.33% ^{37}Cl). A 25 cm^3 Ge(Li) detector for detecting γ-rays, FWHM=2.3 keV for Eγ=1.332 MeV. Measured Eγ. Deduced levels, half-lives using DSAM.

1974Hu09: ^{37}Cl(p,p′γ), E=5.65 MeV protons from the pulsed beam facility of the University of Alberta Van de Graaff accelerator. Targets of natural KCl on tantalum backing and $PbCl_2$ on gold backing. A 24 cm^3 coaxial Ge(Li) detector. Measured Eγ. Deduced half-life for the level of 3103 keV.

1975Av03: ^{37}Cl(p,p′), E=15 MeV protons produced from the Bucharest I.A.P. FN tandem accelerator. Target of 80 μg/cm^2 $BaCl_2$ on a carbon plus Formvar backing. A 2mm silicon detector for detecting protons. Measured σ(E_p,θ). Deduced levels.

Others: 1971Ta08, 1972Bo02, 1974Av06, 1975De16.

^{37}Cl Levels

E(level)†	J^π#	$T_{1/2}$@	Comments
0	3/2$^+$		J^π: from Adopted Levels.
1726.5 *1*		0.13 ps *3*	E(level): weighted average of 1726.3 *2* (1986La10), 1726.4 *3* (1969Du08), 1726.6 *1* (1972Br45), and 1726.44 *20* (1972Bo02). J^π: from pγ(θ) in 1969Du08. $T_{1/2}$: 0.16 ps *5* from 1969Du08, 12 ps *+4−2* from 1972Br45.
3086.1 *4*		46 fs *10*	E(level): weighted average of 3085.7 *4* (1986La10), 3087.3 *10* (1969Du08) and 3087 *1* (1972Br45). $T_{1/2}$: from 1969Du08.
3103.2 *2*		11 ps *6*	E(level): weighted average of 3103.8 *4* (1986La10), 3104.6 *10* (1969Du08) and 3103.0 *2* (1972Br45). $T_{1/2}$: from 1974Hu09.
3626.7 *3*	3/2$^-$	28 fs *14*	
3707.7 *3*	5/2	66 fs *21*	
3741.2 *4*	(3/2$^+$,5/2,7/2$^+$)	<21 fs	
4010.6 *4*	9/2	1.0 ps *+7−4*	
4015.9 *4*	(1/2,3/2$^-$)	0.13 ps *6*	
4179.6 *5*	3/2$^-$	0.8 ps *+14−4*	
4270.2 *6*	1/2	<42 fs	
4272.9 *6*	7/2$^-$	0.19 ps *+21−7*	
4397.5 *7*			
4459.2 *2*	7/2		
4560‡ *20*			
4810‡ *20*			
4920‡ *20*			
5060‡ *20*			
5270‡ *20*			
5350‡ *20*			

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^{37}Cl(p,p′γ),(p,p) 1986La10,1969Du08 (continued)

^{37}Cl Levels (continued)

† From 1986La10, unless otherwise noted.
‡ From 1975Av03.
# From the comparison of experimental angular distribution with the theoretical prediction of Hauser-Feshbach theory in 1986La10, unless otherwise noted.
@ From 1986La10 using DSAM, unless otherwise noted.

γ(^{37}Cl)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Comments
1726.5		1726.4 *2*	100	0	3/2$^+$	E_γ: from 1972Bo02. Mult.: M1+E2 (1969Du08). A_2=−0.08 *8*, A_4=−0.11 *11* (1969Du08). B(M1)(W.u.)=0.031, B(E2)(W.u.)=36.37 (1969Du08). B(M1)(W.u.)=0.031 *7*, B(E2)(W.u.)=3.3 *17* (1972Br45).
3086.1		1361	<5	1726.5		E_γ,I_γ: from 1969Du08.
		3086	100	0	3/2$^+$	Mult.: M1+E2 (1972Br45). B(M1)(W.u.)<0.02, B(E2)(W.u.)<7.4 (1972Br45).
3103.2		3104	100	0	3/2$^+$	
3626.7	3/2$^-$	1901	44 *5*	1726.5		
		3627	56 *5*	0	3/2$^+$	
3707.7	5/2	622	<4	3086.1		
		1982	20 *5*	1726.5		
		3708	80 *5*	0	3/2$^+$	
3741.2	(3/2$^+$,5/2,7/2$^+$)	3741	100	0	3/2$^+$	
4010.6	9/2	907	73 *7*	3103.2		
		4011	27 *7*	0	3/2$^+$	
4015.9	(1/2,3/2$^-$)	930	100	3086.1		
		2290	<10	1726.5		
		4016	<10	0	3/2$^+$	
4179.6	3/2$^-$	553	42 *8*	3626.7	3/2$^-$	
		1076	<6	3103.2		
		1094	<4	3086.1		
		4180	58 *8*	0	3/2$^+$	
4270.2	1/2	2544	100	1726.5		
4272.9	7/2$^-$	1187	100	3086.1		
4397.5		4398	100	0	3/2$^+$	
4459.2	7/2	1355	43 *6*	3103.2		
		1373	57 *6*	3086.1		

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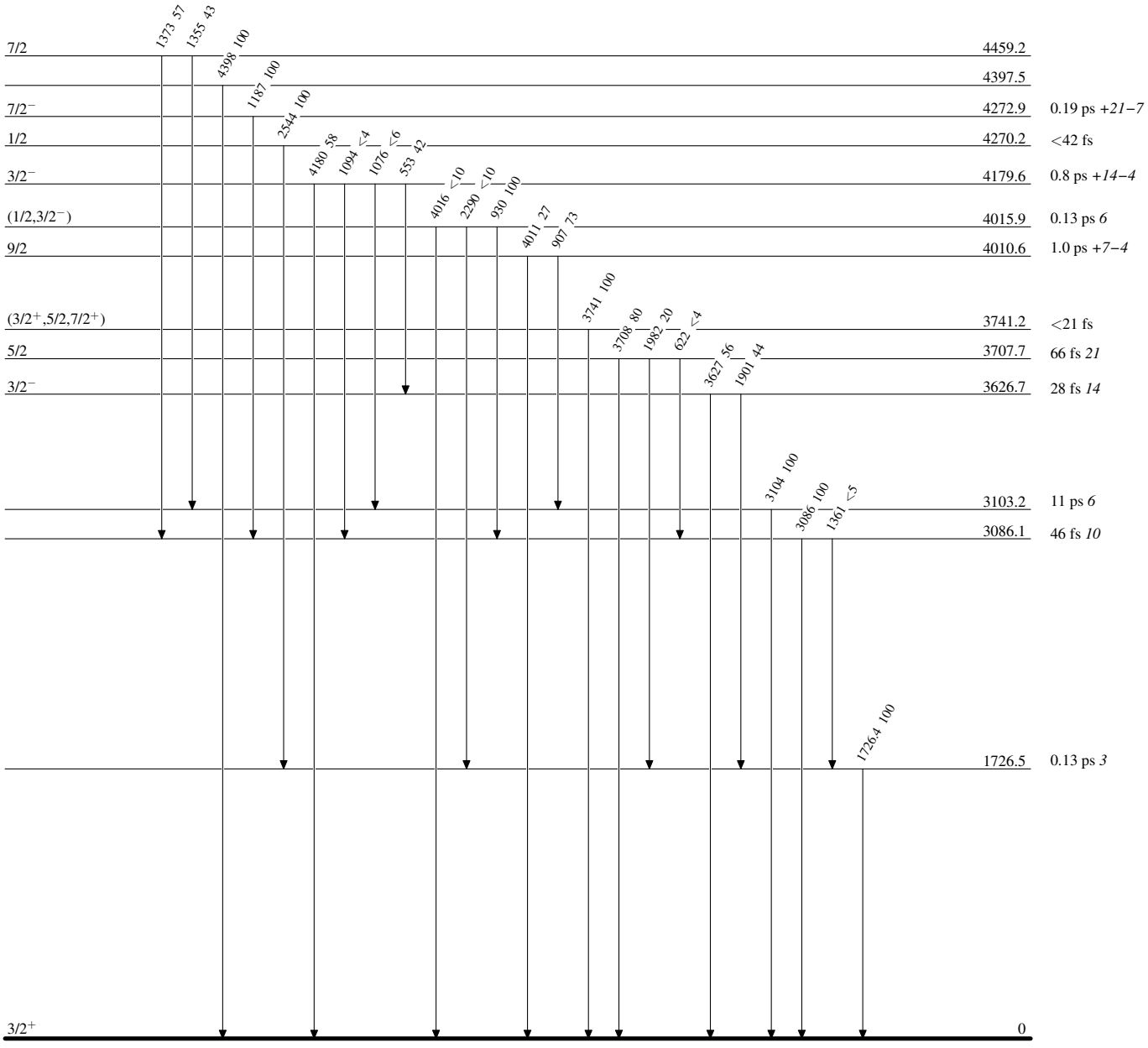
Level Scheme

Intensities: % photon branching from each level



$^{37}_{17}Cl_{20}$