^{2}H(^{31}P,pγ) 1997Ka15

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 201,1 (2025)	31-Oct-2024

1997Ka15: E≈24 and ≈29 MeV ^{31}P beams were produced from the 5-MV tandem accelerator at the Accelerator Laboratory of the University of Helsinki. Targets were prepared by first implanting 100-keV ^{20}Ne (trapping site for ^{2}H) and then 45-keV ^{2}H molecular ions into 1-mm-thick gold sheets. γ rays were detected with an escape-suppressed HPGe spectrometer. Measured Eγ, Iγ, Doppler-shift attenuation. Deduced levels, lifetimes, transition strengths. Comparisons with available data. 1997Ka15 have also reanalyzed previous lifetime measurements for some of the levels.

^{32}P Levels

E(level)[†]	J$^{\pi}$[†]	T$_{1/2}$[‡]	Comments
0	1^{+}		
78	2^{+}		
513	0^{+}		
1149	1^{+}	182 fs *12*	T$_{1/2}$: τ(fs)=255 *18*, 271 *19*.
1323	2^{+}	358 fs *24*	T$_{1/2}$: τ(fs)=510 *35*, 525 *45*.
1755	3^{+}	426 fs *28*	T$_{1/2}$: τ(fs)=600 *40*, 635 *50*.
2177	3^{+}	59 fs *10*	T$_{1/2}$: τ(fs)=94 *16*, 78 *15*.
2218	2^{+}	165 fs *20*	T$_{1/2}$: τ(fs)=260 *25*, 200 *33*.
2658	2^{+}	8.3 fs *28*	T$_{1/2}$: τ(fs)=11 *4*, 14 *5*.
2740	1^{+}	14 fs *5*	T$_{1/2}$: τ(fs)=16 *7*, 23 *7*.
3005	3^{+}	73 fs *11*	T$_{1/2}$: τ(fs)=108 *16*, 103 *16*.
3264	2^{-}	115 fs *15*	T$_{1/2}$: τ(fs)=190 *25*, 147 *22*.
3444	4^{-}	264 fs *31*	T$_{1/2}$: τ(fs)=365 *45*, 400 *50*.
3793	(1)$^{+}$	4.0 fs *14*	T$_{1/2}$: τ(fs)=5.4 *20*, 6.0 *20*.
3881	2^{+}	<14 fs	T$_{1/2}$: τ(fs)<20 (24 and 29 MeV).
3989	(3)$^{+}$	<10 fs	T$_{1/2}$: τ(fs)<15 (24 and 29 MeV).
4009	2^{-}	130 fs *28*	T$_{1/2}$: τ(fs)=160 *60*, 200 *40*.
4036	1^{-}	1.5 fs *6*	T$_{1/2}$: from τ=2.1 fs *8* at E(beam)=29 MeV. Other: τ<3 fs (24 MeV).
4149	3^{-}	19 fs *7*	T$_{1/2}$: τ(fs)=28 *10*, 26 *10*.
4204	1^{+}	2.9 fs *8*	T$_{1/2}$: τ(fs)=4.2 *11*, 4.3 *12*.
4410	0^{-}	13.2 fs *21*	T$_{1/2}$: τ(fs)=14 *6*, 20 *3*.
4662	2^{-}	2.8 fs *5*	T$_{1/2}$: τ(fs)=3.9 *8*, 4.0 *7*.
4877	1^{-}	4.0 fs *8*	T$_{1/2}$: τ(fs)=4.5 *13*, 6.6 *11*.
5350	2^{-}	5.3 fs *6*	T$_{1/2}$: τ(fs)=8.0 *9*, 7.1 *9*.
5509	(1)$^{-}$	7.1 fs *10*	T$_{1/2}$: τ(fs)=10.2 *20*, 10.3 *15*.
5779	1^{-}	1.0 fs *5*	T$_{1/2}$: from τ=1.5 fs *7* at E(beam)=24 MeV. Other: τ<3 fs (29 MeV).
6062	1^{-}	1.0 fs *4*	T$_{1/2}$: from τ=1.5 fs *6* at E(beam)=29 MeV. Other: τ<5 fs (24 MeV).
6196	1^{-}	<3.5 fs	T$_{1/2}$: τ(fs)<5 (29 MeV).
6333	(0,1)$^{+}$	<3.5 fs	T$_{1/2}$: τ(fs)<5 (29 MeV).

[†] From Adopted Levels. Energies are rounded values.

[‡] From DSAM in 1997Ka15. Quoted values are weighted average of the two values given under comments measured at E(beam)=24 MeV and 29 MeV, respectively, where available.

γ(^{32}P)

1997Ka15 report no γ-ray data from their measurement, except for a few γ-ray spectra. The information about gamma-ray branching ratios quoted in 1997Ka15 has been taken mostly from an (n,γ) thermal work quoted as private communication (reference 35 in 1997Ka15). The mixing ratios have been taken from 1990En08 evaluation.

Continued on next page (footnotes at end of table)

$^{2}H(^{31}P,p\gamma)$ 1997Ka15 (continued)

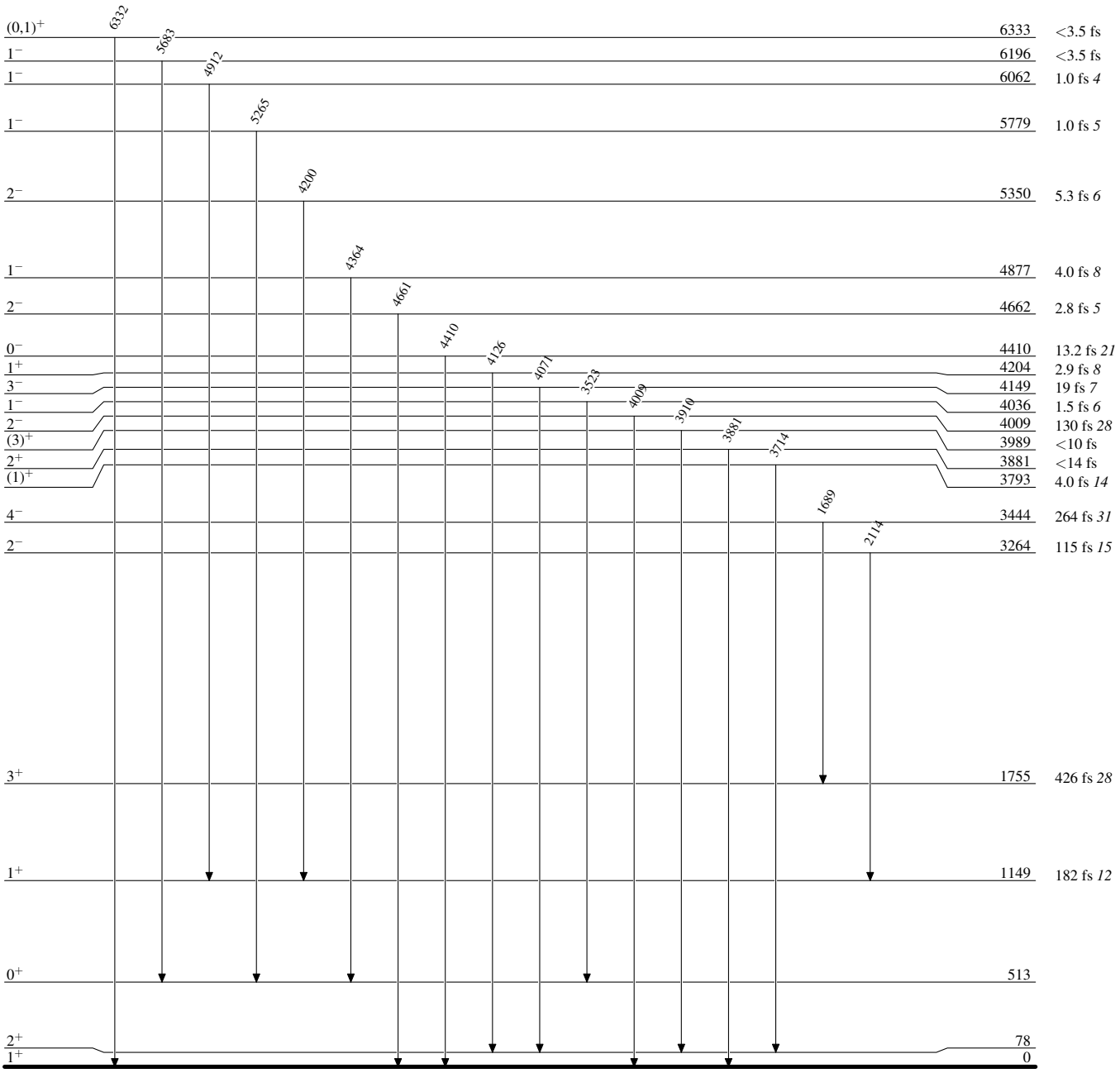
$\gamma(^{32}P)$ (continued)

E_γ †	E_i(level)	J_i^π	E_f	J_f^π	E_γ †	E_i(level)	J_i^π	E_f	J_f^π
637	1149	1^+	513	0^+	3910	3989	$(3)^+$	78	2^+
1323	1323	2^+	0	1^+	4009	4009	2^-	0	1^+
1677	1755	3^+	78	2^+	4071	4149	3^-	78	2^+
1689	3444	4^-	1755	3^+	4126	4204	1^+	78	2^+
2100	2177	3^+	78	2^+	4200	5350	2^-	1149	1^+
2114	3264	2^-	1149	1^+	4364	4877	1^-	513	0^+
2218	2218	2^+	0	1^+	4410	4410	0^-	0	1^+
2228	2740	1^+	513	0^+	4661	4662	2^-	0	1^+
2658	2658	2^+	0	1^+	4912	6062	1^-	1149	1^+
2927	3005	3^+	78	2^+	5265	5779	1^-	513	0^+
3523	4036	1^-	513	0^+	5683	6196	1^-	513	0^+
3714	3793	$(1)^+$	78	2^+	6332	6333	$(0,1)^+$	0	1^+
3881	3881	2^+	0	1^+					

† Rounded values from Adopted Gammas. No Eγ values from the work of 1997Ka15 are reported by the authors and the evaluator has listed here the strongest transition from each level, which is likely used in the lifetime measurement using DSAM in 1997Ka15.

^{2}H(^{31}P,pγ) 1997Ka15

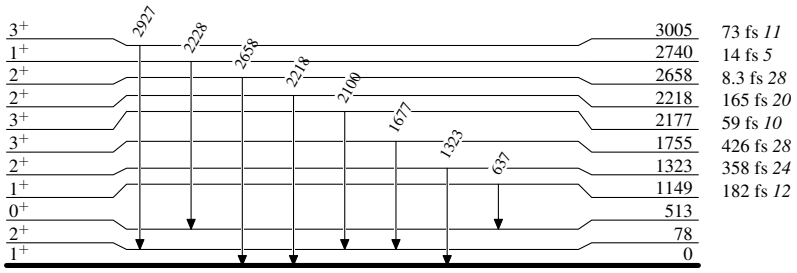
Level Scheme



$^{32}_{15}P_{17}$

^{2}H(^{31}P,pγ) 1997Ka15

Level Scheme (continued)



$^{32}_{15}P_{17}$