

<sup>27</sup>Al(<sup>14</sup>N, $\alpha$ pn $\gamma$ ) **1976Wa11**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Lijie Sun and Jun Chen		NDS 211,1 (2026)	30-Sep-2025

**1976Wa11:** E=40 MeV <sup>14</sup>N beam was produced at the Brookhaven National Laboratory. Target was <sup>27</sup>Al.  $\gamma$  rays were detected with Ge(Li) detectors. Measured E $\gamma$ , I $\gamma$ ,  $\gamma(\theta)$ ,  $\gamma\gamma$ -coin, recoils distances. Deduced levels, J,  $\pi$ , T<sub>1/2</sub>,  $\gamma$ -ray branching ratios, multipolarities.

<sup>35</sup>Cl Levels

E(level) <sup>†‡</sup>	J $\pi$ <sup>#</sup>	T <sub>1/2</sub>	Comments
0	3/2 <sup>+</sup>		
1763.19 10	5/2 <sup>+</sup>		
2645.45 12	7/2 <sup>+</sup>		
3001.98 22	5/2 <sup>+</sup>		
3162.64 9	7/2 <sup>-</sup>	29.0 ps 13	T <sub>1/2</sub> : from $\tau=41.8$ ps 18 ( <b>1976Wa11</b> ).
3942.3 10	9/2 <sup>+</sup>		
4347.43 17	9/2 <sup>-</sup>		
5406.68 19	11/2 <sup>-</sup>		
5926.47 29	11/2 <sup>-</sup>		
6086.89 23	13/2 <sup>-</sup>	5.3 ps 10	T <sub>1/2</sub> : from $\tau=7.7$ ps 14 ( <b>1976Wa11</b> ).
7872.78 30	13/2 <sup>+</sup>		T <sub>1/2</sub> : 0.5 ps < $\tau$ < 50 ps ( <b>1976Wa11</b> ).
8844.2 4	17/2 <sup>+</sup>	5.5 ps 14	T <sub>1/2</sub> : from $\tau=8$ ps 2 ( <b>1976Wa11</b> ).

<sup>†</sup> Additional information 1.

<sup>‡</sup> From a least-squares fit to  $\gamma$ -ray energies.

<sup>#</sup> As given in **1976Wa11** based on measured  $\gamma(\theta)$  and known assignments of low-lying levels. When considered in Adopted Levels, firm assignments here will be placed in parentheses if there are no strong supporting arguments.

$\gamma(^{35}\text{Cl})$

A<sub>2</sub> and A<sub>4</sub> under comments are from  $\gamma(\theta)$  in **1976Wa11**, with A<sub>4</sub>=0 if not given.

E $\gamma$ <sup>†</sup>	I $\gamma$ <sup>†</sup>	E <sub>i</sub> (level)	J $\pi$ <sub>i</sub>	E <sub>f</sub>	J $\pi$ <sub>f</sub>	Comments
160.66 <sup>#</sup> 20	2.3	3162.64	7/2 <sup>-</sup>	3001.98	5/2 <sup>+</sup>	A <sub>2</sub> =-0.24 15.
517.26 10	<2.2 <sup>‡</sup>	3162.64	7/2 <sup>-</sup>	2645.45	7/2 <sup>+</sup>	E $\gamma$ , I $\gamma$ : doublet with $\gamma$ rays in <sup>36</sup> Cl ( <b>1976Wa11</b> ). A <sub>2</sub> =+0.47 25.
680.22 15	25	6086.89	13/2 <sup>-</sup>	5406.68	11/2 <sup>-</sup>	A <sub>2</sub> =-0.20 2.
882.32 35	2.3	2645.45	7/2 <sup>+</sup>	1763.19	5/2 <sup>+</sup>	A <sub>2</sub> =+0.31 40.
971.38 20	8.0	8844.2	17/2 <sup>+</sup>	7872.78	13/2 <sup>+</sup>	A <sub>2</sub> =+0.28 7, A <sub>4</sub> =-0.18 7.
1059.17 20	4.6	5406.68	11/2 <sup>-</sup>	4347.43	9/2 <sup>-</sup>	A <sub>2</sub> =-0.04 15. %Branching=13 4.
1184.80 20	21	4347.43	9/2 <sup>-</sup>	3162.64	7/2 <sup>-</sup>	A <sub>2</sub> =-0.66 4, A <sub>4</sub> =+0.08 4. %Branching=69 5.
1579.15 30	1.9 <sup>‡</sup>	5926.47	11/2 <sup>-</sup>	4347.43	9/2 <sup>-</sup>	A <sub>2</sub> =-0.6 4.
1701.85 25	9.5	4347.43	9/2 <sup>-</sup>	2645.45	7/2 <sup>+</sup>	A <sub>2</sub> =-0.20 3. %Branching=31 5.
1739.3 4	1.7	6086.89	13/2 <sup>-</sup>	4347.43	9/2 <sup>-</sup>	
1763.15 10	32	1763.19	5/2 <sup>+</sup>	0	3/2 <sup>+</sup>	A <sub>2</sub> =-0.28 2, A <sub>4</sub> =+0.05 3.
1786 <sup>#</sup>	0.63	7872.78	13/2 <sup>+</sup>	6086.89	13/2 <sup>-</sup>	E $\gamma$ , I $\gamma$ : inferred from the presence of 680 $\gamma$ -971 $\gamma$ coin ( <b>1976Wa11</b> ). %Branching=8 5.
1946.40 30	1.9	7872.78	13/2 <sup>+</sup>	5926.47	11/2 <sup>-</sup>	A <sub>2</sub> =-0.2 1. %Branching=22 5.

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$^{27}\text{Al}(^{14}\text{N},\alpha\text{pn}\gamma)$  1976Wa11 (continued) $\gamma(^{35}\text{Cl})$  (continued)

$E_\gamma$ †	$I_\gamma$ †	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Comments
2179	5.0	3942.3	9/2 <sup>+</sup>	1763.19	5/2 <sup>+</sup>	$E_\gamma, I_\gamma$ : observed in $\gamma\gamma$ -coin only (1976Wa11).
2244.00 25	32	5406.68	11/2 <sup>-</sup>	3162.64	7/2 <sup>-</sup>	$A_2=+0.23$ 2, $A_4=-0.08$ 2. %Branching=87 4.
2465.85 30	5.9	7872.78	13/2 <sup>+</sup>	5406.68	11/2 <sup>-</sup>	$A_2=-0.21$ 6. %Branching=70 5.
2645.79 30	<26	2645.45	7/2 <sup>+</sup>	0	3/2 <sup>+</sup>	$E_\gamma, I_\gamma$ : doublet with $\gamma$ rays in $^{38}\text{K}$ (1976Wa11).
3162.43 10	100	3162.64	7/2 <sup>-</sup>	0	3/2 <sup>+</sup>	$A_2=+0.37$ 3, $A_4=-0.04$ 3.

† From 1976Wa11. Original values of relative intensities have been renormalized by the evaluators to  $I(3162\gamma)=100$ .

‡ Estimated from  $\gamma\gamma$ -coin data or known branching ratios (1976Wa11).

# Placement of transition in the level scheme is uncertain.

$^{27}\text{Al}(^{14}\text{N},\alpha\text{pn}\gamma)$  1976Wa11

Level Scheme  
 Intensities: Relative  $I_\gamma$

Legend

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

