^{26}Mg(^{18}O,2αnγ) 2021Go09

History

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

2021Go09: ^{26}Mg(^{18}O,2α)^{35}S fusion-evaporation reaction. Exp 1 determined the beam energy for producing high-spin states of ^{35}S: an 80-MeV ^{18}O beam was delivered from the JAEA tandem accelerator facility and impinged on a 0.5-mg/cm^2 thick, self-supporting metallic enriched foil of ^{26}Mg. γ rays were detected using the GEMINI-II array of 14 Ge detectors with BGO Compton-suppressor shields. The reaction channel was selected by detecting the evaporated charged particles with a 4π silicon detector. Measured Eγ, Iγ, $\alpha\gamma\gamma$-coin, $\gamma\gamma(\theta)$(ADO). Exp 2 used the same ^{18}O beam energy, the same target, and the same charged-particle detectors as Exp 1. The beam was delivered from the ALTO-Tandem accelerator facility at IPN Orsay. γ rays were detected using the ORGAM array of 13 Ge detectors based on the EUROGAM array with the BGO scintillator for the anti-Compton suppressor. Compared with large-scale shell-model calculations with the SDPF-MSD4 interaction. Also see 2015GoZY, 2014GoZZ, 2013GoZW, and 2012IdZZ.

^{35}S Levels

E(level)[†‡]	J$^\pi$[#]	T$_{1/2}$	Comments
0.0[@]	3/2$^+$		
1990.6[@] *4*	7/2$^-$		
3594.2[@] *7*	(7/2$^+$)		
3815.0 *6*	(9/2$^-$)		
4023.1 *5*	(11/2$^-$)		
4822.4 *6*	(9/2$^+$)		
4899.6 *7*	(9/2$^+$)		
5009.8 *6*	(11/2$^-$)		
5412.4 *6*	(9/2$^+$)		
5878.0[@] *6*	(11/2$^+$)		
7179.6[@] *7*	(15/2$^+$)		
8023.9[@] *9*	(17/2$^+$)		
8755.7[@] *13*	(17/2)	<1 ps	T$_{1/2}$: estimated by 2021Go09 from residual Doppler energy shifts observed for the 732γ and 1576γ peaks.
10048.4[@] *10*	(19/2)		
12469.1[@] *15*	(21/2)		

† Additional information 1.
‡ From a least-squares fit to γ-ray energies.
# As given in 2021Go09, which quotes the J^π assignments for levels below 8.5 MeV from 2014Ay01 but adds parentheses. 2021Go09 assigns J^π for levels above 8.5 MeV based on the measured $\gamma\gamma(\theta)$(ADO) ratios.
@ Seq.(A): γ cascade based on the g.s.

γ(^{35}S)

$R^{\gamma1}_{ADO}$=Iγ1(47° gated by γ_2 at all angles)/Iγ1(86° gated by γ_2 at all angles). Expected values are ≈0.8 for dipole (ΔJ=1) and ≈1.0 for stretched quadrupole (ΔJ=2) transitions.

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
465.5 *2*	14 *1*	5878.0	(11/2$^+$)	5412.4	(9/2$^+$)	D	R$_{ADO}$=0.67 *11*.
731.6 *15*	8 *3*	8755.7	(17/2)	8023.9	(17/2$^+$)		
844.3 *6*	20 *3*	8023.9	(17/2$^+$)	7179.6	(15/2$^+$)	D	E$_\gamma$: 8443 *6* in 2021Go09 is likely a misprint. R$_{ADO}$=0.51 *8*.

Continued on next page (footnotes at end of table)

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γ(^{35}S) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
868.2 *4*	20 *2*	5878.0	(11/2$^+$)	5009.8	(11/2$^-$)	D	R_{ADO}=0.54 *21*.
978.4 *10*	26 *7*	5878.0	(11/2$^+$)	4899.6	(9/2$^+$)		
986.6 *3*	26 *1*	5009.8	(11/2$^-$)	4023.1	(11/2$^-$)		R_{ADO}=0.91 *13* consistent with ΔJ=(0).
1007.2 *11*	4 *2*	4822.4	(9/2$^+$)	3815.0	(9/2$^-$)	(D)	R_{ADO}=0.87 *15*.
1055.6 *4*	39 *10*	5878.0	(11/2$^+$)	4822.4	(9/2$^+$)	D	R_{ADO}=0.67 *18*.
1228.3 *6*	11 *2*	4822.4	(9/2$^+$)	3594.2	(7/2$^+$)		
1301.6 *3*	56 *11*	7179.6	(15/2$^+$)	5878.0	(11/2$^+$)	Q	R_{ADO}=1.40 *17*.
1305.3 *4*	5 *3*	4899.6	(9/2$^+$)	3594.2	(7/2$^+$)		
1389.0 *8*	9 *2*	5412.4	(9/2$^+$)	4023.1	(11/2$^-$)		
1576.3 *14*	14 *3*	8755.7	(17/2)	7179.6	(15/2$^+$)	D	R_{ADO}=0.43 *9*. 2021Go09 Table I lists this ΔJ=1 ADO ratio for the 731.6γ, which however is a (17/2) to (17/2$^+$) transition with ΔJ=0. 2021Go09 repeatedly states the 8756 level has J=(17/2), and therefore, evaluators reassign this ΔJ=1 ADO ratio to the 1576.3γ, corresponding to a (17/2) to (15/2$^+$) transition.
1824.4 *6*	48 *2*	3815.0	(9/2$^-$)	1990.6	7/2$^-$		
1854.5 *42*	28 *14*	5878.0	(11/2$^+$)	4023.1	(11/2$^-$)		
1990.5 *4*	100	1990.6	7/2$^-$	0.0	3/2$^+$	Q	R_{ADO}=1.30 *8*.
2032.4 *4*	70 *16*	4023.1	(11/2$^-$)	1990.6	7/2$^-$		
2063.3 *14*	32 *6*	5878.0	(11/2$^+$)	3815.0	(9/2$^-$)	D	R_{ADO}=0.58 *41*.
2283.5 *10*	14 *3*	5878.0	(11/2$^+$)	3594.2	(7/2$^+$)		
2420.6 *11*	21 *6*	12469.1	(21/2)	10048.4	(19/2)	(D)	R_{ADO}=0.50 *42*.
2868.7 *8*	26 *2*	10048.4	(19/2)	7179.6	(15/2$^+$)	Q	R_{ADO}=0.98 *13*.
3594.4 *11*	35 *2*	3594.2	(7/2$^+$)	0.0	3/2$^+$	(Q)	R_{ADO}=0.93 *20*.

[†] From 2021Go09.
[‡] From $\gamma\gamma(\theta)$(ADO) data in 2021Go09.

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Level Scheme

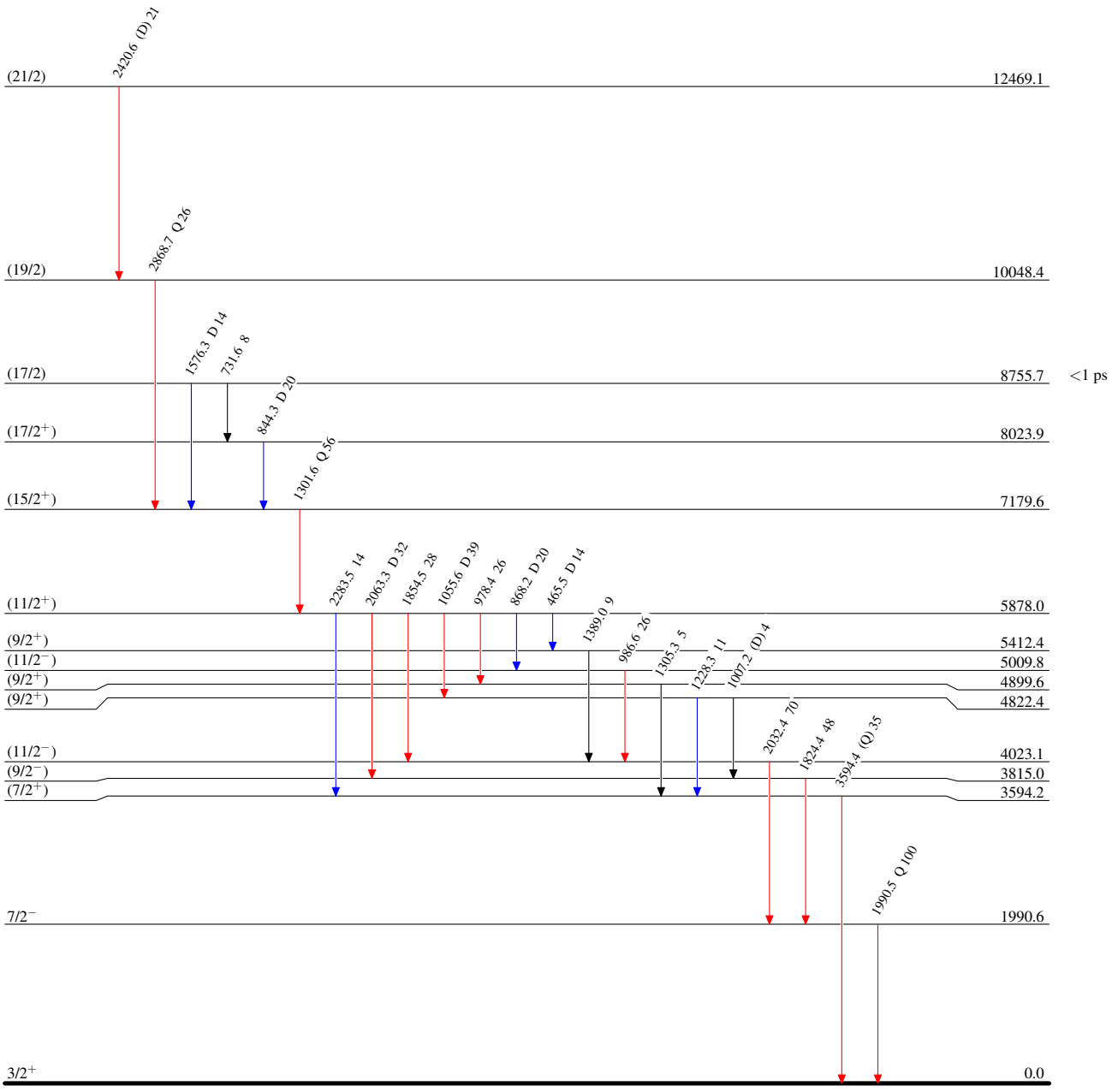
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



$^{35}_{16}S_{19}$

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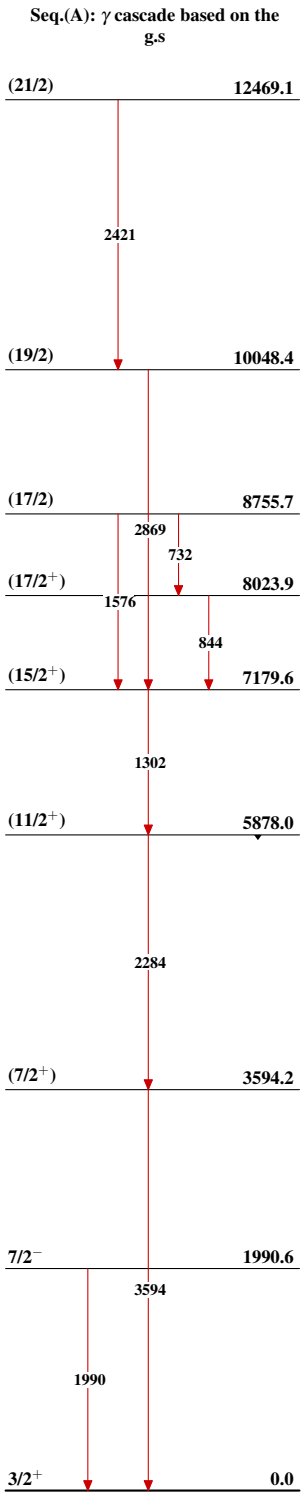

$^{35}_{16}S_{19}$