^{154}Gd(^{20}Ne,5nγ) 1985Re06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 2033 (2008)	1-Jun-2022

E(^{20}Ne)=105-125 MeV; metallic Gd targets enriched to 97% in ^{154}Gd, evaporation-residue separation; measured Eγ, Iγ (Ge, Ge(Li), NaI detectors, high-spin filter, bismuth germanate anti-Compton shield), $\gamma\gamma$ coin, γ-ray angular distributions (5 angles from 0° to 90°). Used pairing-self-consistent cranking model to interpret level structure.
See 1985Re06 for tentative assignment of an additional weak band to ^{169}W.

^{169}W Levels

1985Re06 estimate "y" to be <100 keV.

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
0.0+x#	(9/2$^-$)	1615.1+x# *6*	(25/2$^-$)	3099.7+y& *8*	(39/2$^-$)	5546.2+x# *12*	(53/2$^-$)
0.0+y@	13/2$^+$	1639.0+y@ *6*	29/2$^+$	3452.7+x# *8*	(41/2$^-$)	5671.3+y@ *9*	53/2$^+$
145.3+x# *3*	(11/2$^-$)	1759.1+y& *6*	(27/2$^-$)	3475.2+y@ *8*	41/2$^+$	5784.0+y& *13*	(55/2$^-$)
208.6+y@ *3*	17/2$^+$	2019.2+x# *7*	(29/2$^-$)	3678.3+y& *9*	(43/2$^-$)	6354.9+x# *14*	(57/2$^-$)
327.1+x# *3*	(13/2$^-$)	2160.9+y& *7*	(31/2$^-$)	4088.9+x# *9*	(45/2$^-$)	6568.4+y@ *10*	57/2$^+$
576.0+y@ *4*	21/2$^+$	2269.4+y@ *7*	33/2$^+$	4116.1+y@ *8*	45/2$^+$	6594.9+y& *14*	(59/2$^-$)
734.3+x# *4*	(17/2$^-$)	2434.5+x# *7*	(33/2$^-$)	4324.7+y& *9*	(47/2$^-$)	7224+x?#	(61/2$^-$)
1063.6+y@ *5*	25/2$^+$	2597.8+y& *8*	(35/2$^-$)	4790.5+x# *11*	(49/2$^-$)		
1176.0+x# *5*	(21/2$^-$)	2893.4+y@ *7*	37/2$^+$	4849.4+y@ *9*	49/2$^+$		
1422.6+y& *6*	(23/2$^-$)	2899.8+x# *8*	(37/2$^-$)	5027.8+y& *11*	(51/2$^-$)		

† From least-squares fit to Eγ.
‡ Authors' values, based on coincidence data, rotational-band structure, and γ-ray multipolarities. In Adopted Levels, Gammas, all assignments are given in parentheses.
# Band(A): 5/2[523] band.
@ Band(B): $i_{13/2}$ π=+ band.
& Band(C): π=(−) side band.

γ(^{169}W)

Eγ	Iγ†	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.‡	Comments
145.3 *3*	4.6 *19*	145.3+x	(11/2$^-$)	0.0+x	(9/2$^-$)	D(+Q)	Mult.: A_2=−0.14 *9*. Table 2 (measured ^{169}W transition properties) and Figure 5 (^{169}W level drawing) in 1985Re06 show interchanged order for 145.3γ and 181.7γ; evaluator assumes Figure 5 to be correct.
181.7 *3*	3.4 *14*	327.1+x	(13/2$^-$)	145.3+x	(11/2$^-$)	D(+Q)	Mult.: A_2=−0.15 *10*. See comment with 145.3γ.
208.6 *3*	119 *24*	208.6+y	17/2$^+$	0.0+y	13/2$^+$	Q	Mult.: A_2=+0.23 *2*, A_4=−0.05 *3*.
327.1@ *3*	5.2 *21*	327.1+x	(13/2$^-$)	0.0+x	(9/2$^-$)	(Q)	Mult.: A_2=+0.21 *9*.
336.5 *3*	19# *4*	1759.1+y	(27/2$^-$)	1422.6+y	(23/2$^-$)	Q	Mult.: A_2=+0.22 *8*, A_4=−0.08 *5*.
367.4@ *3*	100 *20*	576.0+y	21/2$^+$	208.6+y	17/2$^+$	Q	Mult.: A_2=+0.31 *3*, A_4=−0.10 *5*.
401.8 *3*	26 *5*	2160.9+y	(31/2$^-$)	1759.1+y	(27/2$^-$)	Q	Mult.: A_2=+0.29 *4*, A_4=−0.08 *5*.
404.1 *3*	15 *3*	2019.2+x	(29/2$^-$)	1615.1+x	(25/2$^-$)	Q	Mult.: A_2=+0.27 *6*, A_4=−0.09 *7*.
407.2 *3*	13 *5*	734.3+x	(17/2$^-$)	327.1+x	(13/2$^-$)	Q	Mult.: A_2=+0.36 *6*, A_4=−0.01 *7*.

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^{154}Gd(^{20}Ne,5nγ) 1985Re06 (continued)

$\gamma(^{169}W)$ (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
415.3 *3*	18 *4*	2434.5+x	(33/2$^-$)	2019.2+x	(29/2$^-$)	Q	Mult.: A_2=+0.25 *6*, A_4=−0.009 *7*.
436.9 *3*	24 *5*	2597.8+y	(35/2$^-$)	2160.9+y	(31/2$^-$)	Q	Mult.: A_2=+0.25 *6*, A_4=−0.03 *7*.
439.1 *3*	15[#] *3*	1615.1+x	(25/2$^-$)	1176.0+x	(21/2$^-$)	(Q)	Mult.: A_2=+0.30 *5*.
441.7 *3*	14[#] *6*	1176.0+x	(21/2$^-$)	734.3+x	(17/2$^-$)	(Q)	Mult.: A_2=+0.13 *6*.
465.3 *3*	25 *5*	2899.8+x	(37/2$^-$)	2434.5+x	(33/2$^-$)	Q	Mult.: A_2=+0.36 *3*, A_4=−0.07 *4*.
487.6 *3*	91 *18*	1063.6+y	25/2$^+$	576.0+y	21/2$^+$	Q	Mult.: A_2=+0.31 *3*, A_4=−0.10 *4*.
501.9 *3*	20 *4*	3099.7+y	(39/2$^-$)	2597.8+y	(35/2$^-$)	Q	Mult.: A_2=+0.32 *3*, A_4=−0.05 *4*.
552.9 *3*	24 *5*	3452.7+x	(41/2$^-$)	2899.8+x	(37/2$^-$)	Q	Mult.: A_2=+0.35 *5*, A_4=−0.09 *6*.
575.4[@] *3*	75 *15*	1639.0+y	29/2$^+$	1063.6+y	25/2$^+$	Q	Mult.: A_2=+0.35 *5*, A_4=−0.13 *6*.
578.6[@] *3*	17 *3*	3678.3+y	(43/2$^-$)	3099.7+y	(39/2$^-$)	Q	Mult.: A_2=+0.30 *6*, A_4=−0.13 *7*.
581.8 *3*	38 *8*	3475.2+y	41/2$^+$	2893.4+y	37/2$^+$	Q	Mult.: A_2=+0.36 *6*, A_4=−0.11 *7*.
624.0 *3*	44 *9*	2893.4+y	37/2$^+$	2269.4+y	33/2$^+$	Q	Mult.: A_2=+0.36 *6*, A_4=−0.12 *7*.
630.4[@] *3*	53 *11*	2269.4+y	33/2$^+$	1639.0+y	29/2$^+$	Q	Mult.: A_2=+0.36 *5*, A_4=−0.11 *6*.
636.2 *3*	14 *6*	4088.9+x	(45/2$^-$)	3452.7+x	(41/2$^-$)	Q	Mult.: A_2=+0.36 *5*, A_4=−0.10 *6*.
640.9 *3*	26 *5*	4116.1+y	45/2$^+$	3475.2+y	41/2$^+$	Q	Mult.: A_2=+0.30 *7*, A_4=−0.04 *8*.
646.4[@] *3*	15 *3*	4324.7+y	(47/2$^-$)	3678.3+y	(43/2$^-$)	Q	Mult.: A_2=+0.30 *7*, A_4=−0.13 *8*.
695.5 *6*	10[#] *4*	1759.1+y	(27/2$^-$)	1063.6+y	25/2$^+$		Contaminated by transition in ^{170}W.
701.6 *6*	12[#] *5*	4790.5+x	(49/2$^-$)	4088.9+x	(45/2$^-$)		Mult.: A_2=+0.27 *5*, A_4=−0.09 *7* for doublet.
703.1 *6*	14[#] *6*	5027.8+y	(51/2$^-$)	4324.7+y	(47/2$^-$)		Mult.: A_2=+0.27 *5*, A_4=−0.09 *7* for doublet.
733.3 *3*	13 *5*	4849.4+y	49/2$^+$	4116.1+y	45/2$^+$	Q	Mult.: A_2=+0.26 *5*, A_4=−0.13 *6*.
755.7 *6*	7[#] *3*	5546.2+x	(53/2$^-$)	4790.5+x	(49/2$^-$)		Mult.: A_2=+0.36 *6*, A_4=−0.12 for doublet.
756.2 *6*	10[#] *4*	5784.0+y	(55/2$^-$)	5027.8+y	(51/2$^-$)		Mult.: A_2=+0.36 *6*, A_4=−0.12 for doublet.
808.7 *6*	4.3[#] *17*	6354.9+x	(57/2$^-$)	5546.2+x	(53/2$^-$)		Mult.: A_2=+0.27 *8* for doublet.
810.9[@] *6*	6.7[#] *27*	6594.9+y	(59/2$^-$)	5784.0+y	(55/2$^-$)		Mult.: A_2=+0.27 *8* for doublet.
821.9 *3*	7 *3*	5671.3+y	53/2$^+$	4849.4+y	49/2$^+$	(Q)	Mult.: A_2=+0.35 *8*.
846.6 *6*	17[#] *3*	1422.6+y	(23/2$^-$)	576.0+y	21/2$^+$		Contaminated by transition in ^{56}Fe.
869[&]	≈2	7224+x?	(61/2$^-$)	6354.9+x	(57/2$^-$)		
897.1 *3*	6.5 *26*	6568.4+y	57/2$^+$	5671.3+y	53/2$^+$	(Q)	Mult.: A_2=+0.13 *9*.

[†] Arbitrary units for E(^{20}Ne)=125 MeV; $\Delta I\gamma$=20% for strong lines (estimated by evaluator to be those with $I\gamma \geq 15$), and 40% for weak lines and doublets.
[‡] Inferred from γ-ray angular distributions.
[#] Obtained from coincidence projection spectra.
[@] Table 2 (measured ^{169}W transition properties) and Figure 5 (^{169}W level drawing) in 1985Re06 show slightly different energy values; evaluator assumes Table 2 to be correct.
[&] Placement of transition in the level scheme is uncertain.

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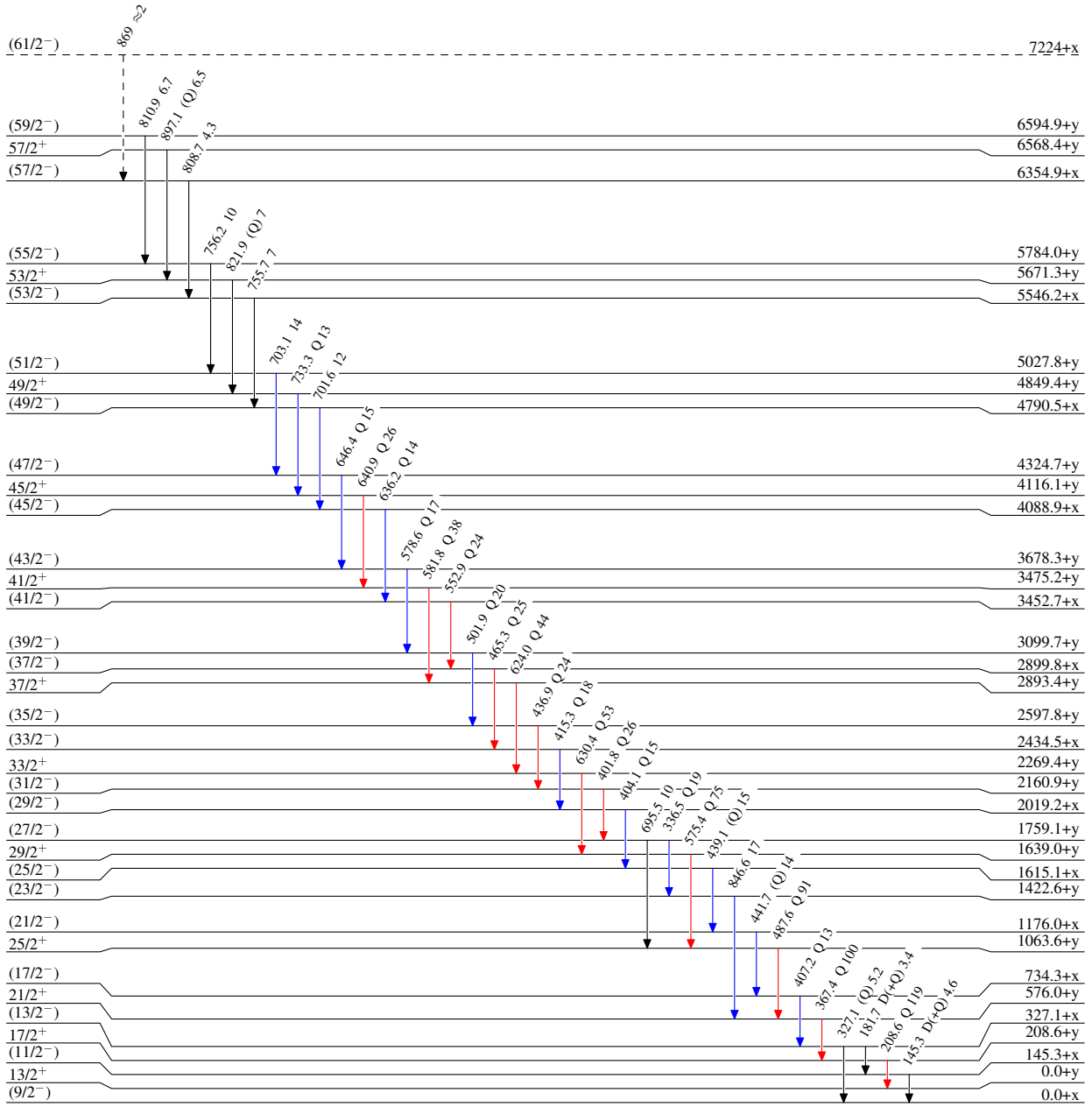
Level Scheme

Intensities: Relative Iγ for E(^{20}Ne)=125 MeV

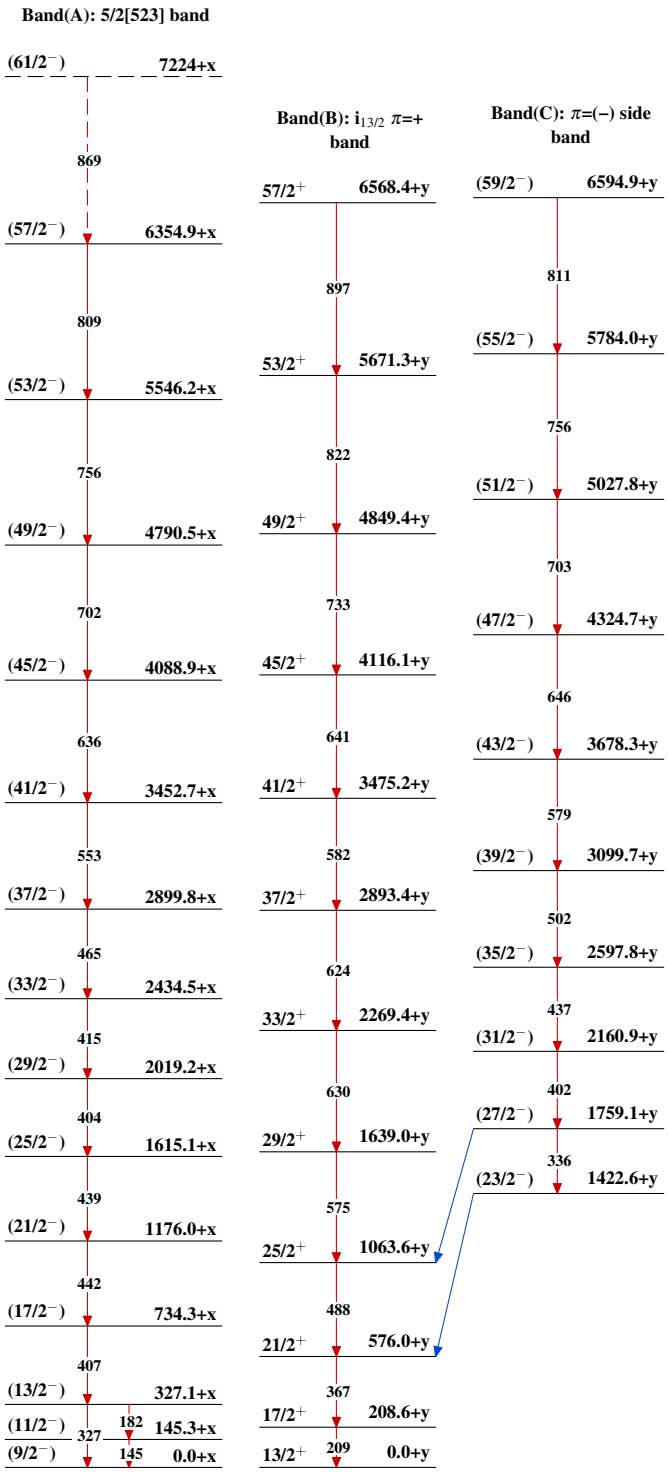
Legend

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



$^{169}_{74}W_{95}$

^{154}Gd(^{20}Ne,5nγ) 1985Re06



$^{169}_{74}W_{95}$