Coulomb excitation 1979Ku18,1971Gr46

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain	NDS 138, 1 (2016)	15-Oct-2016

1979Ku18: E(p)=5.25 MeV; measured thick-target yields (E(p)=4.00-5.25 MeV), γ's, and $\gamma(\theta)$.
1971Gr46: Eα=12 MeV; measured γ rays up to 2 MeV. See also (α,α').
1965Al21: E(^{14}N)=52 MeV; measured Eγ, $\gamma\gamma$.
The 230, 400, 500, 570, 630, 680, 800, 850, 910, 1070 γ rays from 1965Al21 were not confirmed by 1971Gr46. The 472.3 and 558.4 γ rays tentatively placed by 1971Gr46 were not confirmed by 1979Ku18. Levels proposed earlier at 570, 850, 1020 and 1070 were not confirmed by 1979Ku18, and are omitted here. On the other hand 1979Ku18 proposed a new level at 830 keV with $J^\pi=3/2^+$ and B(E2)↑=0.0067 *5* decaying by an 830γ with A_2=+0.0236 *40*. This level seems erroneous as it is not confirmed in any other spectroscopic investigations, thus omitted here.
Additional information 1.
All data are from 1979Ku18, except as noted.
1979Ku18 propose a level at 830 (with B(E2)=0.0067 *5*) deexciting by an E2 γ to the g.s. This level and associated γ have not been confirmed in any other study.

^{139}La Levels

E(level)	J^π[†]	$T_{1/2}$[‡]	Comments
0.0	7/2$^+$[#]		
167.6? *9*	5/2$^+$[#]		B(E2)↑≤0.008 (1971Gr46)
1218.7 *9*	9/2$^+$	0.58 ps *9*	B(E2)↑=0.040 *6* B(E2)↑: Unweighted av of 0.046 *3* (1979Ku18) and 0.034 *3* (1971Gr46).
1257.5 *9*	5/2$^+$,7/2$^+$		B(E2)↑=0.012 *4* B(E2)↑: Unweighted av of 0.016 *2* (1979Ku18) and 0.0086 *21* (1971Gr46).
1421.4 *10*	5/2$^+$,7/2$^+$		B(E2)↑=0.0150 *15* Other B(E2)=0.015 *3* (1971Gr46).
1538.4 *9*	7/2$^+$	0.044 ps *7*	B(E2)↑=0.060 *6* Other B(E2)=0.063 *9* (1971Gr46).
1578.9 *10*	5/2$^+$,7/2$^+$		B(E2)↑=0.059 *5* Other B(E2)=0.050 *9* (1971Gr46).
1683.8 *10*	5/2$^+$,7/2$^+$		B(E2)↑=0.051 *7*
1715.0 *10*	5/2$^+$		B(E2)↑=0.062 *7*
1767.2 *10*	3/2$^+$		B(E2)↑=0.047 *7*

[†] From comparison of excitation functions to theory and $\gamma(\theta)$, except as noted.
[‡] From B(E2) using adopted J^π and γ properties.
[#] From the Adopted Levels.

γ(^{139}La)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	Comments
167.6?	5/2$^+$	165.1[&b] *10*		0.0	7/2$^+$			
1218.7	9/2$^+$	1051.1 *10*	10 *1*	167.6?	5/2$^+$	E2		A_2=+0.0098 *14*
		1218.7 *10*	90 *1*	0.0	7/2$^+$	E2+M1	−4.9 *4*	A_2=−0.0071 *3* δ: alternate of −0.033 *3* excluded since it would imply B(M1)(W.u.)=17 *4*.
1257.5	5/2$^+$,7/2$^+$	1090.3 *10*	58 *1*	167.6?	5/2$^+$	E2+M1		A_2=−0.0394 *39* δ: $\delta(5/2^+)$=−0.28 *6* or +3.5 *7*, $\delta(7/2^+)$=+0.26 *5* or −23 *5*.
		1257.2 *10*	42 *1*	0.0	7/2$^+$	E2+M1		A_2=−0.068 *7*

Continued on next page (footnotes at end of table)

Coulomb excitation 1979Ku18,1971Gr46 (continued)

$\gamma(^{139}La)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	δ[@]	Comments
								δ: $\delta(5/2^+)=-0.28$ *6* or -2.3 *5*, $\delta(7/2^+)=-0.19$ *4* or -1.5 *3*.
1421.4	$5/2^+,7/2^+$	1421.4 *10*	100	0.0	$7/2^+$	E2+M1		$A_2=-0.078$ *6*
								δ: $\delta(5/2^+)=-0.31$ *5* or -2.2 *3*, $\delta(7/2^+)=-0.15$ *2* or $+5.3$ *9*.
1538.4	$7/2^+$	1370.5[a]	50 *2*	167.6?	$5/2^+$	E2+M1	−0.81 *25*	$A_2=+0.272$ *41*
		1538.7 *10*	50 *2*	0.0	$7/2^+$	E2+M1	−0.89 *9*	$A_2=+0.0604$ *30*
1578.9	$5/2^+,7/2^+$	1578.9 *10*	100	0.0	$7/2^+$	M1+E2		$A_2=-0.0726$ *36*
								δ: $\delta(5/2^+)=-0.29$ *3* or -2.2 *2*, $\delta(7/2^+)=-0.17$ *2* or $+1.6$ *2*.
1683.8	$5/2^+,7/2^+$	1683.8 *10*	100	0.0	$7/2^+$	M1+E2		$A_2=-0.088$ *9*
								δ: $\delta(5/2^+)=-0.10$ *2* or -1.4 *3*, $\delta(7/2^+)=-0.34$ *7* or -2.0 *4*.
1715.0	$5/2^+$	1715.0[a]	100	0.0	$7/2^+$	M1+E2		$A_2=+0.213$ *17*
								δ: +0.42 *7* or $\delta=+3.8$ *6*.
1767.2	$3/2^+$	1767.2[a]	100	0.0	$7/2^+$	E2		$A_2=+0.0222$ *47*

[†] From 1971Gr46 for energies with uncertainties. Others from 1979Ku18.
[‡] Relative photon branching ratios from each level.
[#] From comparison of excitation functions to theory and $\gamma(\theta)$.
[@] From $\gamma(\theta)$.
[&] Not observed by 1979Ku18.
[a] Not observed by 1971Gr46.
[b] Placement of transition in the level scheme is uncertain.

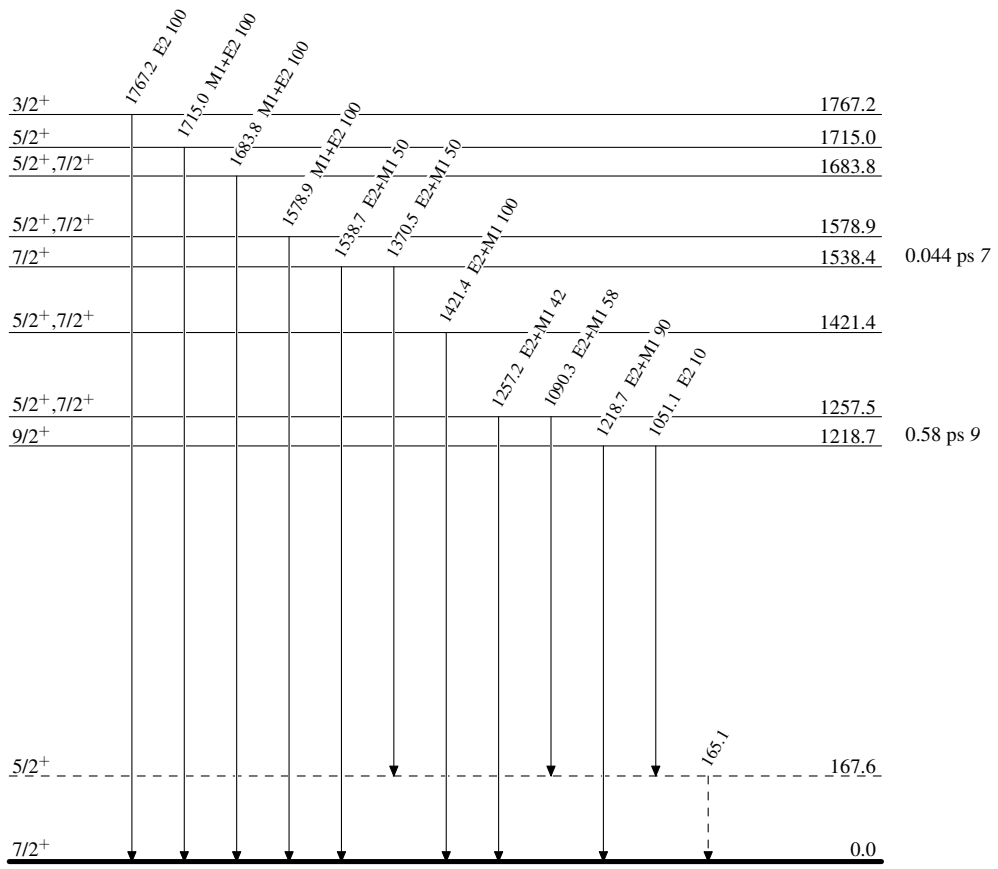
Coulomb excitation 1979Ku18,1971Gr46

Legend

Level Scheme

Intensities: % photon branching from each level

γ Decay (Uncertain)



$^{139}_{57}La_{82}$