Coulomb excitation 2016Cl03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020

2016Cl03, 2016Cl01: ^{60}Ni,^{208}Pb(^{98}Rb,^{98}Rbγ): ^{98}Rb ions were contaminant of ^{98}Sr beam at 276 MeV from REX-ISOLDE-CERN facility. Targets were 2.1 mg/cm^2 thick ^{60}Ni and 1.5 mg/cm^2 thick ^{208}Pb. Scattered Rb ions and target recoils were detected using an annular double-sided silicon strip detector (DSSSD) and γ rays were detected with the MINIBALL HPGe detector array. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma(\theta)$, recoil distance. Deduced levels, J, lifetimes, γ-ray transition strengths. Comparisons with available data.

2015Bo11: ^{7}Li(^{98}Rb,^{98}Rbγ): E=2.85 MeV/nucleon ^{98}Rb beam was produced from REX-ISOLDE facility with strong contaminant of isobaric ^{98}Sr. Target was a 1.5 mg/cm^2 LiF enriched in ^{7}Li. Scattered particles were detected with the T-REX system consisting of a Si compact-disk (CD) detector with two layers to act as a ΔE-E detector for particle identification placed at forward angles; γ rays were detected using the MINIBALL array consisting of 24 six-fold segmented HPGe crystals. Measured Eγ, Iγ, $\gamma\gamma$-coin, (particle)γ-coin. Transitions of 51, 95, 115 keV where observed in coincidence with ^{7}Li particles and can be attributed to excitation of either the ^{98}Rb or ^{98}Sr beam components. As the 51γ and 115γ are not in coincidence with the 144-keV, 2^+ to 0^+ transition in ^{98}Sr, 2015Bo11 placed them as possibly belonging to ^{98}Rb.

Additional information 1.

All data including level scheme are from 2016Cl03, unless otherwise noted. No level scheme is reported by 2016Cl01 and 2015Bo11.

^{98}Rb Levels

E(level)†	J$^\pi$	T$_{1/2}$	Comments
0.0	0$^{(-)}$		J$^\pi$: from the Adopted Levels.
50.2 *3*		<0.7‡ ns	
113.8 *2*	(2$^-$)	1.18 ns *35*	J$^\pi$: Coulomb excitation from J^π=0$^{(-)}$ g.s. 2016Cl03 propose same parity for the 114 and 432 levels. T$_{1/2}$: from RDDS analysis, and scaled upwards by a factor of 1.4, as estimated from a comparison of lifetime determined using a similar analysis for the first 2^+ state in ^{98}Sr and the corresponding value in literature.
144.9 *15*		<0.7‡ ns	
244.0 *20*		<0.7‡ ns	
258.4 *2*			
432.1 *6*	(1$^-$,2$^-$)		J$^\pi$: 2016Cl03 propose 1 or 2, based on 432γ to the g.s. The authors also propose same parity for g.s., 114, and 432 levels.
636.8 *15*			

† From a least-squares fit to γ-ray energies.

‡ Estimated from Doppler correction for 50.2-, 94.7-, and 99.1-keV γ rays.

γ(^{98}Rb)

Assignment of γ rays to ^{98}Rb is based on the analysis of $\gamma\gamma$-coin data in 2016Cl03, which shows that these are not in coincidence with any known transition in ^{98}Sr or ^{98}Y.

E$_\gamma$	γ counts†	E$_i$(level)	E$_f$	J$^\pi_f$	Comments
50.2 *3*	379×10^1 *13*	50.2	0.0	0$^{(-)}$	Other Iγ values for ^{208}Pb target: 2790 *180* in 29.2°−41.9° (c.m.) range, 2890 *130* in 45.2°−68.1° (c.m.) range, 440 *220* in 132.5°−139.9° (c.m.) range. Iγ values for ^{60}Ni target: 2050 *80* in 54.0°−69.9° (c.m.) range, 1500 *150* in 72.7°−97.5° (c.m.) range, 450 *60* in 100.0°−112.9° (c.m.) range.
94.7 *14*	413×10^1 *14*	144.9	50.2		Other Iγ values for ^{208}Pb target: 520 *120* in 29.2°−41.9° (c.m.) range, 1440 *150*

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Coulomb excitation 2016Cl03 (continued)

$\gamma(^{98}Rb)$ (continued)

E_γ	γ counts[†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
						in 45.2°−68.1° (c.m.) range, 630 *50* in 132.5°−139.9° (c.m.) range. Iγ values for ^{60}Ni target: 1110 *110* in 54.0°−69.9° (c.m.) range, 1580 *120* in 72.7°−97.5° (c.m.) range, 560 *40* in 100.0°−112.9° (c.m.) range.
99.1 *13*	433×10[1] *18*	244.0		144.9		Other Iγ values for ^{208}Pb target: 600 *130* in 29.2°−41.9° (c.m.) range, 1570 *130* in 45.2°−68.1° (c.m.) range, 640 *60* in 132.5°−139.9° (c.m.) range. Iγ values for ^{60}Ni target: 1050 *120* in 54.0°−69.9° (c.m.) range, 1550 *120* in 72.7°−97.5° (c.m.) range, 640 *50* in 100.0°−112.9° (c.m.) range.
113.8 *2*	500×10[1] *50*	113.8	(2$^-$)	0.0	0$^{(-)}$	Other Iγ values for ^{208}Pb target: 2530 *190* in 29.2°−41.9° (c.m.) range, 3050 *300* in 45.2°−68.1° (c.m.) range, 600 *60* in 132.5°−139.9° (c.m.) range. Iγ values for ^{60}Ni target: 2500 *150* in 54.0°−69.9° (c.m.) range, 2090 *110* in 72.7°−97.5° (c.m.) range, 640 *40* in 100.0°−112.9° (c.m.) range.
258.4 *2*	120×10[1] *20*	258.4		0.0	0$^{(-)}$	Other Iγ values for ^{208}Pb target: 550 *40* in 29.2°−41.9° (c.m.) range, 730 *60* in 45.2°−68.1° (c.m.) range, 180 *20* in 132.5°−139.9° (c.m.) range. Iγ values for ^{60}Ni target: 410 *30* in 54.0°−69.9° (c.m.) range, 380 *30* in 72.7°−97.5° (c.m.) range, 131 *16* in 100.0°−112.9° (c.m.) range.
318.3 *8*	80×10[1] *30*	432.1	(1$^-$,2$^-$)	113.8	(2$^-$)	Other Iγ values for ^{208}Pb target: 60 *60* in 29.2°−41.9° (c.m.) range, 170 *30* in 45.2°−68.1° (c.m.) range, 101 *14* in 132.5°−139.9° (c.m.) range. Iγ values for ^{60}Ni target: 210 *20* in 72.7°−97.5° (c.m.) range, 81 *11* in 100.0°−112.9° (c.m.) range.
378.4 *14*	210 *80*	636.8		258.4		Other Iγ value for ^{208}Pb target: 50 *16* in 45.2°−68.1° (c.m.) range. Iγ values for ^{60}Ni target: 90 *12* in 72.7°−97.5° (c.m.) range, 36 *9* in 100.0°−112.9° (c.m.) range.
432.1 *8*		432.1	(1$^-$,2$^-$)	0.0	0$^{(-)}$	There is a γ transition of 433 from 6$^+$ to 4$^+$ in ^{98}Sr, but 2016Cl03 find inconsistency in the yields of this line at forward and backward angles, suggesting the presence of another line, possibly belonging to ^{98}Rb.

[†] From 2016Cl03 for ^{208}Pb target in the 84.4°−127.3°(c.m.) range. Corresponding values for other angles, and for the ^{60}Ni target are given under comments. All values are without efficiency correction.

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Level Scheme

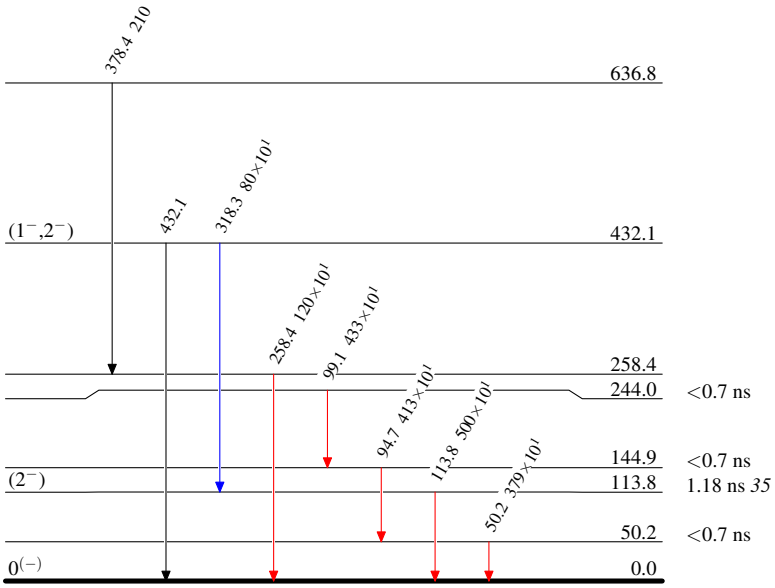
Intensities: Relative I_γ

Legend

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

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

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



$^{98}_{37}Rb_{61}$