

⁶³Cu(n,γ),(n,n):resonances 2018MuZY

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 178, 41 (2021).	12-Nov-2021

$J^\pi(^{63}\text{Cu g.s.})=3/2^-$.

All data are taken from 2018MuZY evaluation which is based on the the following experimental references:

1977Pa04, 1977Pa05 (also 1976Pa17, 1976PaZL): E=3-150 keV. 1977Pa04 report 86 s-wave (51 J=1 and 35 J=2) and 44 p-wave resonances. 1977Pa05 report 167 resonances from 3 to 50 keV.

1969A109 (also 1969A111, 1968A105): E=0.5 to 31.5 keV. 43 resonances reported with J values and other parameters.

1970St12: E=0.579 keV, 2.06 keV, 2.66 keV. Measured primary γ .

Others: 1973Mu20 (E=18-28 keV), 1969Ke15, 1969Ju01, 1968We18, 1965Wa21.

Additional information 1.

2018MuZY also give partial neutron widths $2g\Gamma_n^0$ and $2g\Gamma_n^1$.

⁶⁴Cu Levels

g=statistical factor.

E(level) [†]	J ^π	L	Comments
S(n)-1.87?	2 ⁻	0	E(level): fictitious level.
S(n)-0.271?	2 ⁻	0	E(level): fictitious level.
S(n)+0.402 2	(⁺)	(1)	$2g\Gamma_n=0.000354$ eV 3.
S(n)+0.579 1	2 ⁻	0	$2g\Gamma_n=0.738$ eV 25, $\Gamma_\gamma=0.485$ eV 40.
S(n)+0.650 1	1 ⁽⁻⁾	(0)	$2g\Gamma_n=0.0127$ eV 3, $\Gamma_\gamma=0.35$ eV 10.
S(n)+0.807 1	(⁺)	(1)	$2g\Gamma_n=0.0050$ eV 4.
S(n)+0.994 1	(⁻)	(0)	$2g\Gamma_n=0.0166$ eV 10.
S(n)+0.9943			$g\Gamma_n=0.0073$ eV, $g\Gamma_n^0=0.00023$ eV.
S(n)+2.038 3	1 ⁻	0	$2g\Gamma_n=32$ eV 1, $\Gamma_\gamma=0.50$ eV 7.
S(n)+2.642 4	2 ⁻	0	$2g\Gamma_n=6.6$ eV 5, $\Gamma_\gamma=0.58$ eV 5.
S(n)+3.316 4	(⁺)	(1)	$2g\Gamma_n=0.0224$ eV 17.
S(n)+3.5094 40	(⁺)	(1)	$2g\Gamma_n=0.019$ eV 2.
S(n)+3.8185 40	(⁺)	(1)	$2g\Gamma_n=0.0036$ eV 14.
S(n)+4.383 4	(⁺)	(1)	$2g\Gamma_n=0.0236$ eV 12.
S(n)+4.402 4	1 ⁻	0	$2g\Gamma_n=4.0$ eV 1, $\Gamma_\gamma=0.652$ eV 20.
S(n)+4.4453 50	(⁺)	(1)	$2g\Gamma_n=0.0312$ eV 13.
S(n)+4.865 4	1 ⁻	0	$2g\Gamma_n=10.5$ eV 5, $\Gamma_\gamma=0.67$ eV 2.
S(n)+5.261 5	(⁺)	(1)	$2g\Gamma_n=0.016$ eV 2.
S(n)+5.373 5	(⁺)	(1)	$2g\Gamma_n=0.004$ eV 2.
S(n)+5.400 5	2 ⁻	0	$2g\Gamma_n=45.0$ eV 15, $\Gamma_\gamma=0.56$ eV 2.
S(n)+5.831 6	2 ⁻	0	$2g\Gamma_n=11.7$ eV 7, $\Gamma_\gamma=0.50$ eV 2.
S(n)+6.850 7	(⁺)	(1)	$2g\Gamma_n=0.170$ eV 8.
S(n)+7.094 7	(⁻)	(0)	$2g\Gamma_n=0.47$ eV 40, $\Gamma_\gamma=0.412$ eV 20.
S(n)+7.570 8	1 ⁻	0	$2g\Gamma_n=13.0$ eV 5, $\Gamma_\gamma=0.625$ eV 20.
S(n)+7.950 8	2 ⁻	0	$2g\Gamma_n=95$ eV 5, $\Gamma_\gamma=0.805$ eV 60.
S(n)+8.367 8	1 ⁻	0	$2g\Gamma_n=4.54$ eV 20, $\Gamma_\gamma=0.62$ eV 4.
S(n)+8.646 9	(⁺)	(1)	$2g\Gamma_n=0.200$ eV 18.
S(n)+8.667 9	(⁺)	(1)	$2g\Gamma_n=0.162$ eV 12.
S(n)+9.207 9	2 ⁻	0	$2g\Gamma_n=58$ eV 6, $\Gamma_\gamma=0.38$ eV 2.
S(n)+9.774 10	(⁻)	(0)	$2g\Gamma_n=5.44$ eV 34, $\Gamma_\gamma=0.383$ eV 17.
S(n)+9.94 1	1 ⁻	0	$2g\Gamma_n=80$ eV 4, $\Gamma_\gamma=0.99$ eV 7.
S(n)+10.332 10	(⁺)	(1)	$2g\Gamma_n=0.214$ eV 18.
S(n)+10.566 11	(⁺)	(1)	$2g\Gamma_n=0.016$ eV 2.
S(n)+10.651 11	(⁺)	(1)	$2g\Gamma_n=0.022$ eV 2.
S(n)+10.840 11	2 ⁻	0	$2g\Gamma_n=74$ eV 4, $\Gamma_\gamma=0.379$ eV 30.
S(n)+12.520 13	1 ⁻	0	$2g\Gamma_n=10$ eV 1, $\Gamma_\gamma=0.45$ eV 2.

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$^{63}\text{Cu}(n,\gamma),(n,n)$:resonances 2018MuZY (continued) ^{64}Cu Levels (continued)

E(level) [†]	J ^π	L	Comments
S(n)+12.911 13	(⁻)	(0)	2gΓ _n =1.04 eV 16, Γ _γ =0.485 eV 90.
S(n)+12.973 13	(⁺)	(1)	2gΓ _n =0.114 eV 6.
S(n)+13.078 13	(⁺)	(1)	2gΓ _n =0.054 eV 8.
S(n)+13.170 13	2 ⁻	0	2gΓ _n =92.4 eV 50, Γ _γ =0.574 eV 60.
S(n)+13.720 14	1 ⁻	0	2gΓ _n =22.4 eV 25, Γ _γ =0.460 eV 26.
S(n)+14.079 14	(⁺)	(1)	2gΓ _n =0.24 eV 2.
S(n)+14.465 14	(⁺)	(1)	2gΓ _n =0.028 eV 4.
S(n)+14.570 15	(⁺)	(1)	2gΓ _n =0.004 eV 4.
S(n)+14.600 15	[1 ⁻]	(0)	2gΓ _n =3.40 eV 18, Γ _γ =0.407 eV 20.
S(n)+15.080 15	1 ⁻	0	2gΓ _n =16.0 eV 15, Γ _γ =0.431 eV 20.
S(n)+15.160 15	[1 ⁻]	(0)	2gΓ _n =4.4 eV 2, Γ _γ =0.330 eV 15.
S(n)+15.810 16	1 ⁻	0	2gΓ _n =17.7 eV 5, Γ _γ =0.57 eV 7.
S(n)+15.842 16	(⁺)	(1)	2gΓ _n =0.016 eV.
S(n)+15.933 16	(⁺)	(1)	2gΓ _n =0.10 eV 2.
S(n)+16.108 16	(⁻)	(0)	2gΓ _n =4.76 eV 60, Γ _γ =0.495 eV 5.
S(n)+16.300 16	1 ⁻	0	2gΓ _n =14.0 eV 14, Γ _γ =0.65 eV 5.
S(n)+16.626 17	[1 ⁺]	(1)	2gΓ _n =0.74 eV 2, Γ _γ =0.207 eV 20.
S(n)+17.332 17	(⁺)	(1)	2gΓ _n =0.06 eV 2.
S(n)+17.853 17	(⁺)	(1)	2gΓ _n =0.150 eV 28.
S(n)+17.855 18	2 ⁻	0	2gΓ _n =65.5 eV 30, Γ _γ =0.40 eV 5.
S(n)+17.894 18	(⁺)	(1)	2gΓ _n =0.124 eV 22.
S(n)+17.949 18	(⁺)	(1)	2gΓ _n =0.084 eV 16.
S(n)+18.044 18	(⁺)	(1)	2gΓ _n =0.036 eV 4.
S(n)+18.117 18	1 ⁻	0	2gΓ _n =40.5 eV 20, Γ _γ =0.44 eV 6.
S(n)+18.365 18	(⁺)	(1)	2gΓ _n =0.034 eV 8.
S(n)+19.411 19	(⁺)	(1)	2gΓ _n =0.040 eV 8.
S(n)+19.537 20	[1 ⁻]	(0)	2gΓ _n =3.2 eV 8, Γ _γ =0.264 eV 20.
S(n)+19.855 20	[1 ⁻]	(0)	2gΓ _n =3.6 eV 6, Γ _γ =0.34 eV 3.
S(n)+20.428 21	[1 ⁻]	(0)	2gΓ _n =3.8 eV 8, Γ _γ =0.53 eV 4.
S(n)+20.478 21	(⁺)	(1)	2gΓ _n =0.076 eV 20.
S(n)+20.956 21	-	0	2gΓ _n =3.6 eV 10, Γ _γ =0.405 eV 40.
S(n)+21.050 21	2 ⁻	0	2gΓ _n =91 eV 8, Γ _γ =0.61 eV 8.
S(n)+21.221 21	1 ⁽⁻⁾	(0)	2gΓ _n =10 eV 2, Γ _γ =0.42 eV 2.
S(n)+21.245 21	1 ⁻	0	2gΓ _n =76.5 eV 76, Γ _γ =0.53 eV .
S(n)+21.267 22	(⁺)	(1)	2gΓ _n =0.04 eV 2.
S(n)+21.301 22	(⁺)	(1)	2gΓ _n =0.04 eV 2.
S(n)+21.559 22	(⁺)	(1)	2gΓ _n =0.9 eV 1.
S(n)+21.740 22	(⁺)	(1)	2gΓ _n =0.04 eV 2.
S(n)+21.780 22	[1 ⁻]	(0)	2gΓ _n =3.4 eV 10, Γ _γ =0.55 eV 2.
S(n)+22.082 22	[1 ⁻]	(0)	2gΓ _n =3 eV 1, Γ _γ =0.421 eV 15.
S(n)+22.790 23	2 ⁻	0	2gΓ _n =120 eV 6, Γ _γ =0.54 eV 5.
S(n)+23.153 23	[1 ⁺]	(1)	2gΓ _n =0.298 eV 54, Γ _γ =0.34 eV 2.
S(n)+23.337 23	(⁻)	(0)	2gΓ _n =2.4 eV 10, Γ _γ =0.227 eV 6.
S(n)+23.389 23	[1 ⁺]	(1)	2gΓ _n =0.388 eV 40, Γ _γ =0.54 eV 2.
S(n)+23.550 24	(⁺)	(1)	2gΓ _n =0.08 eV 2.
S(n)+23.612 24	[3 ⁺]	(1)	2gΓ _n =3.1 eV 10, Γ _γ =0.320 eV 6.
S(n)+23.914 24	[1 ⁻]	(0)	2gΓ _n =2.0 eV 11, Γ _γ =0.465 eV 12.
S(n)+24.334 24	(⁺)	(1)	2gΓ _n =0.06 eV 2.
S(n)+24.384 24	(⁺)	(1)	2gΓ _n =0.14 eV 2.
S(n)+24.905 25	2 ⁻	0	2gΓ _n =83 eV 5, Γ _γ =0.21 eV 4.
S(n)+24.957 25	[1 ⁺]	(1)	2gΓ _n =1.2 eV 2, Γ _γ =0.220 eV 25.
S(n)+24.992 25	(⁺)	(1)	2gΓ _n =0.174 eV 10.
S(n)+25.245 25	[3 ⁺]	(1)	2gΓ _n =0.6 eV 2, Γ _γ =0.214 eV 20.
S(n)+25.733 25	(⁺)	(1)	2gΓ _n =0.06 eV 2.
S(n)+25.800 26	1 ⁻	0	2gΓ _n =230 eV 23, Γ _γ =0.240 eV 75.

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$^{63}\text{Cu}(n,\gamma),(n,n)$:resonances 2018MuZY (continued) ^{64}Cu Levels (continued)

E(level) [†]	J ^π	L	Comments
S(n)+25.816 26	[3 ⁺]	(1)	2gΓ _n =1.2 eV 6, Γ _γ =0.214 eV 18.
S(n)+25.975 26	(-)	(0)	2gΓ _n =9.5 eV 20.
S(n)+26.102 26	(+)	(1)	2gΓ _n =0.184 eV 50.
S(n)+26.469 27	(+)	(1)	2gΓ _n =0.33 eV 9.
S(n)+26.590 27	1 ⁻	0	2gΓ _n =83 eV 8, Γ _γ =0.72 eV 8.
S(n)+27.060 27	(+)	(1)	2gΓ _n =0.3 eV 2.
S(n)+27.253 27	[3 ⁺]	(1)	2gΓ _n =0.68 eV 24, Γ _γ =0.240 eV 15.
S(n)+27.915 28	[2 ⁺]	(1)	2gΓ _n =0.26 eV 20, Γ _γ =0.270 eV 24.
S(n)+28.155 28	[2 ⁺]	(1)	2gΓ _n =0.22 eV 16, Γ _γ =0.27 eV 2.
S(n)+28.677 29	[2 ⁺]	(1)	2gΓ _n =0.38 eV 6, Γ _γ =0.27 eV 1.
S(n)+28.809 29	(+)	(1)	2gΓ _n =0.08 eV 2.
S(n)+29.150 29	[2 ⁺]	(1)	2gΓ _n =0.24 eV 4, Γ _γ =0.27 eV 1.
S(n)+29.465 30	(+)	(1)	2gΓ _n =0.070 eV 16.
S(n)+29.54 3	1 ⁻	0	2gΓ _n =235 eV 18, Γ _γ =0.75 eV 10.
S(n)+30.27 3	(+)	(1)	2gΓ _n =0.10 eV 2.
S(n)+30.541 31	1 ⁻	0	2gΓ _n =7.2 eV 8, Γ _γ =0.639 eV 42.
S(n)+30.836 31	(+)	(1)	2gΓ _n =0.064 eV 12.
S(n)+31.232 31	[2 ⁺]	(1)	2gΓ _n =1.52 eV 6, Γ _γ =0.30 eV 2.
S(n)+31.307 31	(+)	(1)	2gΓ _n =0.266 eV 50.
S(n)+31.390 31	1 ⁻	0	2gΓ _n =45.0 eV 25.
S(n)+31.433 31	[2 ⁺]	(1)	2gΓ _n =0.268 eV 54, Γ _γ =0.27 eV 6.
S(n)+31.486 32	[2 ⁺]	(1)	2gΓ _n =0.90 eV 26, Γ _γ =0.29 eV 4.
S(n)+32.201 32	[2 ⁻]	(0)	2gΓ _n =7.6 eV 16, Γ _γ =0.31 eV 4.
S(n)+32.408 32	[2 ⁺]	(1)	2gΓ _n =1.22 eV 20, Γ _γ =0.280 eV 33.
S(n)+32.937 33	[3 ⁺]	(1)	2gΓ _n =1.34 eV 22, Γ _γ =0.220 eV 25.
S(n)+33.340 33	1 ⁻	0	2gΓ _n =210 eV 20, Γ _γ =0.52 eV 10.
S(n)+34.135 34	[2 ⁻]	(0)	2gΓ _n =6.8 eV 14, Γ _γ =0.31 eV 1.
S(n)+34.268 34	[2 ⁻]	(0)	2gΓ _n =6.8 eV 12, Γ _γ =0.230 eV 25.
S(n)+34.527 35	[2 ⁻]	(0)	2gΓ _n =6.4 eV 10, Γ _γ =0.220 eV 27.
S(n)+34.778 35	(+)	(1)	2gΓ _n =0.18 eV 10.
S(n)+34.850 35	[2 ⁺]	(1)	2gΓ _n =0.22 eV 10, Γ _γ =0.27 eV 6.
S(n)+35.102 35	(+)	(1)	2gΓ _n =0.10 eV 4.
S(n)+35.335 35	(+)	(1)	2gΓ _n =0.22 eV 10.
S(n)+35.559 35	(+)	(1)	2gΓ _n =0.22 eV 10.
S(n)+35.843 35	(+)	(1)	2gΓ _n =1.1 eV 2.
S(n)+36.135 36	2 ⁻	0	2gΓ _n =94 eV 10, Γ _γ =0.55 eV 6.
S(n)+36.235 36	(+)	(1)	2gΓ _n =0.22 eV 10.
S(n)+36.833 37	2 ⁻	0	2gΓ _n =84 eV 12, Γ _γ =0.32 eV 8.
S(n)+36.930 37	[1 ⁺]	(1)	2gΓ _n =2.4 eV 2, Γ _γ =0.55 eV 2.
S(n)+37.121 37	(+)	(1)	2gΓ _n =0.018 eV 12.
S(n)+37.970 37	1 ⁻	0	2gΓ _n =15 eV 3, Γ _γ =0.47 eV 2.
S(n)+38.061 38	(+)	(1)	2gΓ _n =0.7 eV 2.
S(n)+38.467 39	(+)	(1)	2gΓ _n =0.10 eV 4.
S(n)+38.519 39	(+)	(1)	2gΓ _n =0.38 eV 13.
S(n)+38.769 39	[1 ⁺]	(1)	2gΓ _n =1.6 eV 4, Γ _γ =0.46 eV 3.
S(n)+39.388 39			
S(n)+39.475 39	[2 ⁻]	(0)	2gΓ _n =8 eV 1, Γ _γ =0.81 eV 5.
S(n)+39.842 40	(+)	(1)	2gΓ _n =0.12 eV 2.
S(n)+40.315 40	[2] ⁻	0	2gΓ _n =8 eV 1, Γ _γ =0.62 eV 5.
S(n)+40.585 41	1 ⁻	0	2gΓ _n =12.8 eV 15, Γ _γ =0.40 eV 5.
S(n)+40.701 41	(-)	(0)	2gΓ _n =3.7 eV 8, Γ _γ =0.600 eV 45.
S(n)+41.037 41	(+)	(1)	2gΓ _n =0.90 eV 2.
S(n)+41.215 41	(+)	(1)	2gΓ _n =0.12 eV 2.
S(n)+41.525 42	(+)	(1)	2gΓ _n =0.074 eV 28.
S(n)+41.735 42	(+)	(1)	2gΓ _n =0.012 eV 2.
S(n)+41.990 42	2 ⁻	0	2gΓ _n =186 eV 13, Γ _γ =0.58 eV 8.

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$^{63}\text{Cu}(n,\gamma),(n,n)$:resonances 2018MuZY (continued) ^{64}Cu Levels (continued)

E(level) [†]	J ^π	L	Comments
S(n)+42.045 42	(+)	(1)	2gΓ _n =0.30 eV 8.
S(n)+42.225 42	(+)	(1)	2gΓ _n =2.8 eV 10.
S(n)+42.416 42	(+)	(1)	2gΓ _n =0.74 eV 24.
S(n)+42.500 43	1 ⁻	0	2gΓ _n =210.0 eV 75, Γ _γ =0.55 eV 8.
S(n)+42.647 43	(+)	(1)	2gΓ _n =0.64 eV 10.
S(n)+43.820 44	(+)	(1)	2gΓ _n =0.14 eV 2.
S(n)+44.000 44	(+)	(1)	2gΓ _n =1.4 eV 7.
S(n)+44.158 44	[1] ⁻	0	2gΓ _n =7 eV 1, Γ _γ =0.58 eV 5.
S(n)+44.712 45	(+)	(1)	2gΓ _n =0.028 eV 22.
S(n)+44.800 45	1 ⁻	0	2gΓ _n =45 eV 5, Γ _γ =0.19 eV 13.
S(n)+44.815 45	(+)	(1)	2gΓ _n =0.60 eV 58.
S(n)+44.885 45	(+)	(1)	2gΓ _n =0.2 eV 1.
S(n)+44.926 45	[1 ⁺]	(1)	2gΓ _n =0.16 eV 6.
S(n)+45.135 45	[1 ⁺]	(1)	2gΓ _n =1.58 eV 12, Γ _γ =0.4 eV 1.
S(n)+45.235 45	[2 ⁻]	(0)	2gΓ _n =9.6 eV 14, Γ _γ =0.44 eV 9.
S(n)+45.655 46	(+)	(1)	2gΓ _n =0.14 eV 6.
S(n)+45.695 46	(+)	(1)	2gΓ _n =0.38 eV 14.
S(n)+45.910 46	[2 ⁻]	(0)	2gΓ _n =12.8 eV 16, Γ _γ =0.34 eV 5.
S(n)+46.374 46	[1 ⁺]	(1)	2gΓ _n =0.42 eV 12.
S(n)+46.696 47	[2 ⁻]	(0)	2gΓ _n =20 eV 2, Γ _γ =0.40 eV 5.
S(n)+46.725 47	(+)	(1)	2gΓ _n =0.42 eV 14.
S(n)+47.510 48	[2] ⁻	0	2gΓ _n =12 eV 2, Γ _γ =0.82 eV 16.
S(n)+47.650 48	1 ⁻	0	2gΓ _n =30 eV 4, Γ _γ =0.45 eV 10.
S(n)+47.830 48	(1 ⁻)	(0)	2gΓ _n =3.0 eV 4, Γ _γ =0.55 eV 5.
S(n)+47.900 48	[1 ⁺]	(1)	2gΓ _n =0.50 eV 14.
S(n)+48.079 48	[1 ⁺]	(1)	2gΓ _n =0.48 eV 12.
S(n)+48.324 48	[1 ⁻]	(0)	2gΓ _n =6.4 eV 16, Γ _γ =0.60 eV 7.
S(n)+48.405 48	(+)	(1)	2gΓ _n =0.32 eV 4.
S(n)+48.745 48	(+)	(1)	2gΓ _n =0.76 eV 20.
S(n)+49.468 48	(+)	(1)	2gΓ _n =0.50 eV 14.
S(n)+49.502 48	(+)	(1)	2gΓ _n =0.02 eV 2.
S(n)+50.25 5	1 ⁻	0	2gΓ _n =78.1 eV 40.
S(n)+52.85 5	+	1	
S(n)+53.11 5	+	1	2gΓ _n =40 eV 10.
S(n)+53.76 5	1 ⁻	0	2gΓ _n =483 eV 14.
S(n)+54.90 6	2 ⁻	0	2gΓ _n =335 eV 12.
S(n)+55.30 6	1 ⁻	0	2gΓ _n =470 eV 30.
S(n)+56.30 6	2 ⁻	0	2gΓ _n =110 eV 9.
S(n)+56.93 6	+	1	
S(n)+57.70 6	1 ⁻	0	2gΓ _n =12 eV 3.
S(n)+58.41 6	1 ⁻	0	2gΓ _n =80 eV 8.
S(n)+59.11 9	1 ⁻	0	2gΓ _n =35.4 eV 45.
S(n)+59.42 6	2 ⁻	0	2gΓ _n =14.0 eV 36.
S(n)+59.90 6	1 ⁻	0	2gΓ _n =12.5 eV 20.
S(n)+60.43 6	+	1	2gΓ _n =8.2 eV 14.
S(n)+60.64 6	+	1	
S(n)+62.63 6	+	1	2gΓ _n =5.0 eV 12.
S(n)+63.19 6	1 ⁻	0	2gΓ _n =70 eV 7.
S(n)+64.97 7	1 ⁻	0	2gΓ _n =197 eV 12.
S(n)+65.30 7	2 ⁻	0	2gΓ _n =25.0 eV 38.
S(n)+66.28 7	1 ⁻	0	2gΓ _n =216.4 eV 90.
S(n)+66.88 7	+	1	2gΓ _n =10.8 eV 12.
S(n)+68.07 7	+	1	
S(n)+68.86 7	-	0	2gΓ _n =18.0 eV 23.
S(n)+69.64 7	1 ⁻	0	2gΓ _n =130 eV 20.
S(n)+70.54 7	+	1	2gΓ _n =12.2 eV 18.

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⁶³Cu(n,γ),(n,n):resonances 2018MuZY (continued)

⁶⁴Cu Levels (continued)

E(level) [†]	J ^π	L	Comments
S(n)+71.28 7	+	1	2gΓ _n =46 eV 2.
S(n)+72.17 7	2 ⁻	0	2gΓ _n =90 eV 10.
S(n)+72.79 7	2 ⁻	0	2gΓ _n =524 eV 23.
S(n)+73.73 7	1 ⁻	0	2gΓ _n =413 eV 14.
S(n)+74.58 8	1 ⁻	0	2gΓ _n =45.0 eV 75.
S(n)+75.94 8	2 ⁻	0	2gΓ _n =28 eV 6.
S(n)+76.38 8	+	1	
S(n)+77.53 8	+	1	
S(n)+77.71 8	+	1	
S(n)+77.95 8	1 ⁻	0	2gΓ _n =61 eV 6.
S(n)+79.03 8	1 ⁻	0	2gΓ _n =105 eV 20.
S(n)+79.44 8	+	1	
S(n)+81.44 8	2 ⁻	0	2gΓ _n =935 eV 35.
S(n)+84.01 8	+	1	
S(n)+84.45 9	+	1	2gΓ _n =22.4 eV 20.
S(n)+85.86 9	+	1	2gΓ _n =13.2 eV 20.
S(n)+87.29 9	+	1	2gΓ _n =15.6 eV 38.
S(n)+87.50 9	+	1	2gΓ _n =12.8 eV 18.
S(n)+88.81 9	+	1	2gΓ _n =7.6 eV 16.
S(n)+89.68 9	1 ⁻	0	2gΓ _n =323 eV 120.
S(n)+89.94 9	2 ⁻	0	2gΓ _n =12.5 eV 75.
S(n)+91.28 9	2 ⁻	0	2gΓ _n =255 eV 30.
S(n)+92.12 9	1 ⁻	0	2gΓ _n =108 eV 12.
S(n)+93.19 9	+	1	2gΓ _n =16.8 eV 20.
S(n)+93.62 9	+	1	2gΓ _n =26.2 eV 24.
S(n)+94.65 10	1 ⁻	0	2gΓ _n =100 eV 15.
S(n)+95.21 10	+	1	2gΓ _n =27.6 eV 28.
S(n)+95.48 10	+	1	2gΓ _n =22.8 eV 26.
S(n)+95.88 10	2 ⁻	0	2gΓ _n =200 eV 35.
S(n)+96.58 10	+	1	2gΓ _n =8.4 eV 20.
S(n)+96.90 10	-	0	2gΓ _n =31.2 eV 26.
S(n)+98.29 10	+	1	
S(n)+98.80 10	+	1	
S(n)+100.94 10	+	1	2gΓ _n =114 eV 4.
S(n)+101.32 8	2 ⁻	0	2gΓ _n =483 eV 50.
S(n)+102.02 10	+	1	2gΓ _n =40 eV 4.
S(n)+102.42 4	1 ⁻	0	2gΓ _n =110 eV 11.
S(n)+103.23 10	+	1	2gΓ _n =16.4 eV 20.
S(n)+103.80 7	2 ⁻	0	2gΓ _n =363 eV 63.
S(n)+105.05 5	1 ⁻	0	2gΓ _n =143 eV 16.
S(n)+107.40 8	2 ⁻	0	2gΓ _n =625 eV 94.
S(n)+108.72 8	2 ⁻	0	2gΓ _n =575 eV 88.
S(n)+110.18 8	+	1	2gΓ _n =22 eV 3.
S(n)+111.28 8	+	1	2gΓ _n =20.4 eV 28.
S(n)+112.04 8	+	1	2gΓ _n =58 eV 4.
S(n)+114.85 5	1 ⁻	0	2gΓ _n =320 eV 30.
S(n)+116.02 5	+	1	2gΓ _n =7.8 eV 18.
S(n)+116.76 6	1 ⁻	0	2gΓ _n =57.0 eV 68.
S(n)+118.25 5	1 ⁻	0	2gΓ _n =300 eV 30.
S(n)+119.58 8	2 ⁻	0	2gΓ _n =163 eV 31.
S(n)+120.05 10	1 ⁻	0	2gΓ _n =126 eV 12.
S(n)+121.12 10	+	1	2gΓ _n =32.0 eV 32.
S(n)+121.63 10	+	1	2gΓ _n =16.8 eV 24.
S(n)+122.37 10	+	1	2gΓ _n =19.6 eV 22.
S(n)+123.92 10	1 ⁻	0	2gΓ _n =593 eV 60.
S(n)+124.56 10	+	1	2gΓ _n =78 eV 8.

Continued on next page (footnotes at end of table)

$^{63}\text{Cu}(n,\gamma),(n,n)$:resonances 2018MuZY (continued) ^{64}Cu Levels (continued)

E(level) [†]	J ^π	L	Comments
S(n)+125.55 10	1 ⁻	0	2gΓ _n =360 eV 39.
S(n)+126.85 9	1 ⁻	0	2gΓ _n =422 eV 41.
S(n)+128.32 7	2 ⁻	0	2gΓ _n =825 eV 88.
S(n)+129.62 5	1 ⁻	0	2gΓ _n =158 eV 16.
S(n)+130.44 5	+	1	2gΓ _n =12.4 eV 24.
S(n)+131.23 5	2 ⁻	0	2gΓ _n =288 eV 38.
S(n)+133.13 6	2 ⁻	0	2gΓ _n =355 eV 50.
S(n)+134.03 5	2 ⁻	0	2gΓ _n =188 eV 38.
S(n)+135.85 6	2 ⁻	0	2gΓ _n =919 eV 125.
S(n)+136.80 7	2 ⁻	0	2gΓ _n =914 eV 250.
S(n)+136.82 10	1 ⁻	0	2gΓ _n =305 eV 38.
S(n)+137.70 9	1 ⁻	0	2gΓ _n =23.3 eV 30.
S(n)+139.84 7	+	1	2gΓ _n =36 eV 4.
S(n)+140.48 5	2 ⁻	0	2gΓ _n =400 eV 63.
S(n)+141.70 8	2 ⁻	0	2gΓ _n =346 eV 63.
S(n)+143.22 9	+	1	2gΓ _n =36 eV 4.
S(n)+143.67 9	+		2gΓ _n =42 eV 4.
S(n)+144.11 10	+		2gΓ _n =12.6 eV 36.
S(n)+145.11 11	1 ⁻		2gΓ _n =20.3 eV 45.
S(n)+148.35 10	2 ⁻		2gΓ _n =350 eV 63.
S(n)+149.5 1	2 ⁻		2gΓ _n =325 eV 50.
S(n)+151.1 8	1 ⁻		2gΓ _n =525 eV 38.
S(n)+152.7 8	2 ⁻		2gΓ _n =500 eV 50.

[†] The excitation energies are from 7916.5 to 8066.4 keV, corresponding to 275 n-resonances between 0.4 to 152.4 keV.
S(n)(^{64}Cu)=7915.868 24 (2021Wa16).