^{63}Ni(n,γ):resonances 2018MuZY

History

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

J^π(^{63}Ni g.s.)=1/2$^-$.

2018MuZY: Compilation of thermal neutron induced σ and resonance parameter data for nuclei of Z=1-60.

2013Le01: neutrons were produced through spallation reactions of 20 GeV/c protons from the Proton Synchrotron at CERN with a massive Pb target. Target was ^{63}Ni produced by irradiating highly enriched ^{62}Ni in a thermal reactor. Prompt capture γ rays detected by two optimized C_6D_6 liquid scintillation detectors. Measured σ(E_n). Deduced resonances.

2015We14: neutrons from the Manuel Lujan, Jr., Neutron Scattering Center at the Los Alamos Neutron Science Center (LANSCE). Measured σ(E_n). Deduced resonances.

All data are from 2018MuZY, unless otherwise noted. Note that compiled data in 2018MuZY are taken from 2013Le01 and data from 2015We14 is consulted but not used by 2018MuZY.

^{64}Ni Levels

E(n)(lab) under comments are from 2018MuZY, unless otherwise noted.

The neutron energy interval between 2 and 8 keV is dominated by the strong resonance in ^{62}Ni(n,γ) at 4.6 keV; therefore, smaller resonances in ^{63}Ni(n,γ) might be invisible due to this background (2013Le01).

Capture kernel $A_\gamma=g_s\Gamma_n\Gamma_\gamma/(\Gamma_n+\Gamma_\gamma)$, where g_s is the spin statistical factor, Γ_n is the neutron width, and Γ_γ is the radiative width. Values are from 2013Le01.

E(level)[†]	J^π	L	Comments
9657.862 *1*			A_γ(meV)=5.7 *4*. E(n)(Lab)=0.398 keV *1*. E(n)(Lab)=0.39796 keV *4* (2013Le01).
9658.0480 *10*	$0^-,1^-$[‡]	0[‡]	A_γ(meV)=340 *20*. E(n)(Lab)=0.5873 keV *10*. Other: 0.5884 keV *12* (2015We14). E(n)(Lab)=0.58725 keV *9* (2013Le01).
9658.814 *1*	$0^-,1^-$[‡]	0[‡]	A_γ(meV)=810 *40*. E(n)(Lab)=1.366 keV *2*. Other: 1.3631 keV *31* (2015We14). E(n)(Lab)=1.366 keV *1* (2013Le01).
9664.17 *20*			E(n)(Lab)=6.806 keV *32* from 2015We14.
9665.968 *4*			A_γ(meV)=45 *9*. E(n)(Lab)=8.634 keV *4*. E(n)(Lab)=8.634 keV *2* (2013Le01).
9666.309 *6*			A_γ(meV)=50 *10*. E(n)(Lab)=8.981 keV *6*. E(n)(Lab)=8.981 keV *3* (2013Le01).
9666.36 *20*			E(n)(Lab)=9.037 keV *13* from 2015We14.
9666.480 *8*			A_γ(meV)=43 *9*. S: 430 *9* from 2018MuZY is a misprint. E(n)(Lab)=9.154 keV *8*. E(n)(Lab)=9.154 keV *4* (2013Le01).
9667.092 *6*			A_γ(meV)=100 *10*. E(n)(Lab)=9.776 keV *6*. Other: 9.787 keV *18* (2015We14). E(n)(Lab)=9.776 keV *3* (2013Le01).
9669.36 *20*			E(n)(Lab)=12.085 keV *60* from 2015We14.
9670.03 *20*			E(n)(Lab)=12.757 keV *42* from 2015We14.
9671.233 *3*			A_γ(meV)=131 *45*. E(n)(Lab)=13.984 keV *6*. E(n)(Lab)=13.984 keV *3* (2013Le01).
9671.33 *21*			E(n)(Lab)=14.078 keV *14* from 2015We14.
9673.41 *20*			E(n)(Lab)=16.194 keV *28* from 2015We14.
9674.327 *8*			A_γ(meV)=108 *59*.

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^{63}Ni(n,γ):resonances 2018MuZY (continued)

^{64}Ni Levels (continued)

E(level)†	Comments
	E(n)(Lab)=17.127 keV *8*. E(n)(Lab)=17.127 keV *4* (2013Le01).
9675.02 *21*	E(n)(Lab)=17.830 keV *54* from 2015We14.
9676.722 *12*	A_γ(meV)=130 *20*. E(n)(Lab)=19.561 keV *12*. E(n)(Lab)=19.561 keV *6* (2013Le01).
9676.83 *21*	E(n)(Lab)=19.667 keV *47* from 2015We14.
9680.24 *22*	E(n)(Lab)=23.159 keV *96* from 2015We14.
9686.86 *22*	E(n)(Lab)=29.860 keV *102* from 2015We14.
9689.290 *20*	A_γ(meV)=5.0E2 *20*. E(n)(Lab)=32.330 keV *20*. E(n)(Lab)=32.330 keV *10* (2013Le01).
9711.36 *6*	A_γ(meV)=7.0E2 *20*. E(n)(Lab)=54.75 keV *6*. E(n)(Lab)=54.750 keV *30* (2013Le01).

† E(level)=E(n)(c.m.)+S(n)(^{64}Ni), where S(n)(^{64}Ni)=9657.46 *20* (2021Wa16) and E(n)(c.m.)=E(n)(lab)×mass(^{63}Ni)/[m(n)+mass^{63}Ni)]. Relative uncertainties are given here with respect to those in neutron energies. For absolute uncertainty in excitation energy add 0.20 keV in quadrature; this uncertainty dominates for all the levels listed here.

‡ Orbital angular momentum *l*=0 could be deduced from resonance shape.