Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	31-Jul-2015

Q(β^-)=9330 *SY*; S(n)=4340 *SY*; S(p)=15900 *SY*; Q(α)=−11710 *SY* 2012Wa38
Estimated (2012Wa38) uncertainties: 200 for Q(β^-) and S(n), 360 for S(p), 450 for Q(α).
Q(β^-n)=2570 *250*, S(2n)=11160 *200*, S(2p)=30650 *540* (syst,2012Wa38).
1986Go10: ^{129}Cd produced by thermal neutron fission of ^{235}U at OSIRIS, Studsvik facility, measured half-life from decay curve for a 281-keV γ ray, but a γ ray of this energy has not been reported in the detailed study of decay of ^{129}Cd by 2015Ta13.
2003ArZX, 2005Kr20: ^{129}Cd produced through spallation of Uranium using 1 GeV p beam at ISOLDE-CERN facility, Laser isotope separator. Measured β^-n, half-lives by decay curve for delayed neutrons, proportional counter. Two ms-activities assigned to ^{129}Cd.
2015Ta13: measured half-lives of the two activities of ^{129}Cd at RIBF-RIKEN facility.
2015Lo04: measured half-life of a single activity at RIBF-RIKEN facility.

^{129}Cd Levels

Cross Reference (XREF) Flags

A ^{9}Be(^{238}U,Fγ)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0[†]	11/2$^-$[‡]	154[†] ms *2*	A	%β^-=100; %β^-n>0 μ=−0.7063 *5* (2013Yo02,2014StZZ) Q=+0.570 *26* (2013Yo02,2014StZZ) Theoretical %β^-n=0.07 (1997Mo25), 0.77, 0.94 (2002Pf04). %β^-n: there is some experimental evidence of delayed-neutron emission from ^{129}Cd decay from the work of 2003ArZX (also 2005Kr20), but their half-life measurement is in sharp disagreement with that from 2015Ta13. T$_{1/2}$: others: 154.5 ms *20* (2015Lo04, from ion-β correlated curves), 104 ms *6* (2003ArZX,2005Kr20, from decay curves for delayed neutrons). The value from 2015Lo04 may correspond to mixture of the two activities of ^{129}Cd. J$^\pi$,μ,Q: hyperfine structure in collinear laser spectroscopy (2013Yo02). For Q, uncorrelated uncertainty of 0.013, and correlated uncertainty of 0.023 from electric field gradient combined in quadrature. See 2014De06 and 2014Zh02 for theoretical calculations of single-particle occupation probabilities using experimental values of quadrupole moments.
0+x[†]	3/2$^+$[‡]	146[†] ms *8*		%β^-=100; %β^-n>0 μ=+0.8481 *8* (2013Yo02,2014StZZ) Q=+0.132 *9* (2013Yo02,2014StZZ) %β^-n: there is some experimental evidence of delayed-neutron emission from ^{129}Cd decay from the work of 2003ArZX (also 2005Kr20), but their half-life measurement is in sharp disagreement with that from 2015Ta13. E(level): x≈290 keV (2014Ta29) from shell-model calculations. J$^\pi$,μ,Q: hyperfine structure in collinear laser spectroscopy (2013Yo02). For Q, uncorrelated uncertainty of 0.007, and correlated uncertainty of 0.005 from electric field gradient combined in quadrature. See 2014De06 for theoretical calculations of single-particle occupation probabilities using experimental values of quadrupole moments. T$_{1/2}$: others: 242 ms *8* (2003ArZX,2005Kr20, from decay curves for delayed neutrons), 0.27 s *4* (1986Go10, from decay curve for a 281-keV γ ray, but no such γ is reported in the detailed study of decay of activities of ^{129}Cd by 2015Ta13).
1181	(13/2$^-$)[‡]		A	Ordering of the 406-1181 γ cascade is not established experimentally, but the level ordering in energies and spins is predicted by shell-model calculations.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{129}Cd Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF	Comments
1587	$(15/2^-)^{\ddagger}$		A	Configuration=$\nu h^{-1}_{11/2}\otimes\pi g^{-2}_{9/2}$ (2014Ta29).
1940	$(21/2^+)^{\ddagger}$	3.6 ms *2*	A	%IT=100 $T_{1/2}$: from summed time difference distribution of the 406- and 1181-keV γ rays (2014Ta29). Configuration=$\nu h^{-1}_{11/2}\otimes\pi(g^{-1}_{9/2}p^{-1}_{1/2})$ mixed with $\nu h^{-1}_{11/2}\otimes\pi(g^{-1}_{9/2}p^{-1}_{3/2})$ and $\nu h^{-1}_{11/2}\otimes\pi(g^{-1}_{9/2}f^{-1}_{5/2})$ (2014Ta29).

† Ordering of the $11/2^-$ and $3/2^+$ ms-activities of ^{129}Cd is not established experimentally, it is predicted in shell-model calculations by 2014Ta29. Also in 1996Bo11 shell-model calculations, $h_{11/2}$ is predicted to be the ground state. 1995Mo27 also give $11/2^-$ for ground state in theoretical calculations. Half-lives are from measured decay-time distributions of γ-ray transitions in coincidence with parent β^- decay (2015Ta13).

‡ From shell-model predictions (2014Ta29).

$\gamma(^{129}Cd)$

E_i(level)	J^π_i	E_γ	I_γ	E_f	J^π_f	Mult.‡	$\alpha^{\#}$	Comments
1181	$(13/2^-)$	1181†	100	0	$11/2^-$			
1587	$(15/2^-)$	406†	100	1181	$(13/2^-)$	(M1)	0.0111	
		1587	≈33	0	$11/2^-$			
1940	$(21/2^+)$	353	100	1587	$(15/2^-)$	(E3)	0.0665	B(E3)(W.u.)=0.47 *3*

† Ordering of the 406-1181 γ cascade is not established experimentally, but the level ordering in energies and spins is predicted by shell-model calculations.

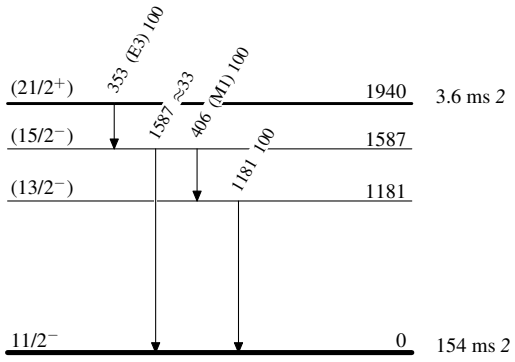
‡ From measured yields of γ rays and conversion electrons for the 353 and 406 transitions.

Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{129}_{48}Cd_{81}$