

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen		NDS 188,1 (2023)	17-Jan-2023

Q(β^-)=7304.9 27; S(n)=4264 3; S(p)=16170 11; Q(α)=-12123 4 [2021Wa16](#)

S(2n)=11570 4, S(2p)=30790 200 (syst) ([2021Wa16](#)).

[1990Be13](#), [1987Ar21](#): ⁷¹Ni produced in ²³⁵U(n,f) and ²³⁹Pu(n,f) E=thermal followed by mass separation at GSI facility. Measured cross section for production of ⁷¹Ni.

[Additional information 1](#).

[1997Wo06](#): ²³⁸U(p,f) E=65 MeV/nucleon. Laser-ion guided facility, Leuven facility. Production of ⁷¹Ni isotope.

[1997Hu09](#): ²³⁸U(p,f) E=25 MeV. Measured yield, fission distribution.

[2002Kr13](#), [2001Fr21](#), [2000Mu10](#), [1998Fr15](#): ²³⁸U(p,f) E=30 MeV, Leuven facility. Measured yield, γ , β , $\beta\gamma$ coin, isotopic half-life.

[2004Sa13](#): ⁷¹Ni produced in the fragmentation of ⁸⁶Kr beam at 58 MeV/nucleon with ¹⁸¹Ta target at GANIL facility.

[2021Pe08](#): ⁷¹Ni produced in ⁹Be(⁸⁶Kr,X),E=140 MeV/nucleon fragmentation reaction, followed by separation of ⁷¹Ni ions using A1900 fragment separator, with specific mass and charge of implanted nuclei determined from the time-of-flight and energy deposit analysis at NSCL-MSU facility. Measured $E\beta$, $I\beta$, $E\gamma$, $I\gamma$, (implants) β -correlations, half-life of the decay of ⁷¹Ni g.s., and total absorption γ spectrum (TAGS) using SuN detector (a Summing NaI(Tl) detector). Deduced B(GT) distribution. Comparison with shell-model and quasi-particle random-phase approximation (QRPA) calculations.

Mass measurements: [2007Ra27](#) (JYFLTRAP, Penning-trap method), [2005Gu36](#), [1994Se12](#).

Level systematics: [2005Gr29](#), [2002Gr16](#).

Theoretical calculations:

[2022Si19](#): calculated levels, J^π , pairing correlations using seniority model.

[2022Si22](#): calculated levels, J^π , dependence of the order of the ground state multiplet (GSM) levels and the splitting of seniority multiplet.

⁷¹Ni Levels

Cross Reference (XREF) Flags

- A ⁷¹Co β^- decay (80 ms)
- B ⁷²Co β^-n decay:mixed

E(level) [†]	J^π [‡]	T _{1/2}	XREF	Comments
0.0	(9/2 ⁺)	2.56 s 3	AB	$\% \beta^- = 100$ T _{1/2} : weighted average of 2.49 s 18 (2021Pe08 , implants- β -correlated decay curve, followed for 12 s; 2.56 s 3 (2001Fr21 , 1998Fr15 , β - γ -correlated decay curve). Other: 1.86 s 35 (1990Be13 , β -fragments-correlated decay curve; T _{1/2} seems discrepant). Configuration= $\nu g_{9/2} \otimes (^{70}\text{Ni g.s.})$. Additional information 2 .
280.8 2	(7/2 ⁺)		AB	$\% \beta^- = 100$ T _{1/2} : isomer identified by 2009St07 in ⁷¹ Co β^- decay; T _{1/2} measured from decay curve for 454 γ .
498.5 6	(1/2 ⁻)	2.3 s 3	AB	
812.8? 5	(5/2 ⁺)		AB	E(level): ordering of the 252-813 γ cascade is interchangeable, thus the level is either at 813 or 252 keV.
1065.4 6	(5/2 ⁻)		AB	
1272.9 7	(5/2 ⁻)		AB	

[†] From ⁷¹Co β^- decay.

[‡] Assignments are from [2010RaZY](#), [2009St07](#) and [2004Sa59](#) based on shell-model predictions.

Adopted Levels, Gammas (continued)
 $\gamma(^{71}\text{Ni})$

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Comments
280.8	(7/2 ⁺)	280.8	2	100	0.0 (9/2 ⁺)	E_γ : other: 280.3 5 in ^{72}Co β^- -n decay (2014Ra20).
812.8?	(5/2 ⁺)	812.8 \ddagger	5	100	0.0 (9/2 ⁺)	
1065.4	(5/2 ⁻)	252.6 \ddagger	4	9 2	812.8? (5/2 ⁺)	
		566.9	2	100	498.5 (1/2 ⁻)	
1272.9	(5/2 ⁻)	774.4	3	100	498.5 (1/2 ⁻)	

\dagger From ^{71}Co β^- decay.

\ddagger Ordering of the 252-813 γ cascade is interchangeable.

Adopted Levels, Gammas
Level Scheme

Intensities: Relative photon branching from each level

