^{54}Fe(p,n) 1990An06,1983Ma37,1971Ki17

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yang Dong, Huo Junde	NDS 121, 1 (2014)	20-Jun-2014

Additional information 1.

1971Ki17: E=14.56 MeV. Plastic scintillator, nγ-coincidence, tof, measured γ and neutron tof spectra with cyclotron pulsing.

1971Be46: E=23 MeV. Liquid scintillators, DWBA analysis.

1981Or02, 1982Oh02: E=32-40 MeV. tof facilities, beam swinger system, measured neutron angular distributions, DWBA analysis.

1983Ma37: E=35 MeV. tof facilities, beam swinger system, plastic scintillator, measured neutron angular distributions, DWBA analysis. Coupled-channels calculations.

1983Ra30: E=160 MeV, beam-swinger facility, one detector station along the 0° line with respect to an undeflected proton beam, time-compensated large-volume neutron detectors, measured $\sigma(\theta$,E(n)).

1990An06, 1991An04: E=135 MeV, tof, FWHM=245 keV, measured $\sigma(\theta)$.

2008Er04: Penning-trap (JYFLTRAP) mass measurements of ^{54}Co using IGISOL facility where ^{54}Co ions were produced by ^{54}Fe(p,n) reaction at E(p)=13-15 MeV. The JYFLTRAP facility used to measure masses of ^{54}Co g.s. and isomer.

Other measurements: 1967Co11. Q=−9023.0 *18* from 1974Ho21. Others: 1967Mu25, 1968SaZX.

^{54}Co Levels

E(level)[#]	J$^\pi$	L[‡]	Comments
0.0	0$^+$	0	Corresponding IAS transition and carrying all the Fermi strength: B(F)=2 (1983Ra30). Measured Q(ε)=8244.54 *10* from Penning-trap mass measurement (2008Er04). J$^\pi$: T=1 isobaric analog of 0$^+$ ground state of ^{54}Fe. For data analysis see also 1968Ba29, 1973Ri15 and 1975Ca18. Ratios of cross sections integrated between 3° and 40°: I(E(p)=40 MeV):I(E(p)=35 MeV):I(E(p)=32 MeV)=1:1.08:1.07. L: L=0 transfer are identified as spin-isospin transitions (excitation of Gamow-Teller states) or as isospin transitions (excitation of isobaric analog states). See 1983Ra30.
190[@] *20*			E(level): T=0 from 1981Or02. Measured Q(ε)=8442.09 *9* from Penning-trap mass measurement (2008Er04).
940[@] *20*	1$^+$[†]		E(level): strong 1$^+$ state represents part of Gamow-Teller strength: B(G-T)=0.73 (1983Ra30). T=0 from 1981Or02. J$^\pi$: J from $\gamma(\theta)$ by 1971Sa05. π from systematics of odd N=Z nuclei up to ^{54}Co.
1440[@] *20*			E(level): T=1 from 1981Or02. Excited state analog of 2$^+$ 1408 keV. The direct process seems to dominate at E=35 MeV (1983Ma37).
1590[@] *20*			E(level): this level is seen E(p)=14 MeV.
1800[@] *20*			
1870[@] *20*			
2010	1$^+$[†]		
2070[@] *20*			
2140[@] *20*			
2285[&]			
2350	1$^+$[†]		
2390			
2645[&]			
3390			
3900	1$^+$[†]		
4130	1$^+$[†]		
4530	1$^+$[†]	0	E(level): E(level)=4500 *300* in 1983Ra30 corresponds to this state and 4800 state.
4800	1$^+$[†]	0	
5200	1$^+$[†]		
5320	1$^+$		T=0 component of the Gamow-Teller giant resonance. J$^\pi$: from the energy dependence of cross sections and angular distribution.

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^{54}Fe(p,n) 1990An06,1983Ma37,1971Ki17 (continued)

^{54}Co Levels (continued)

E(level)[#]	J^π	L[‡]	Comments
5400	1^+[†]		
5920	1^+[†]		
6150	1^+[†]	0	E(level): E(level)=6200 *300* in 1983Ra30 corresponds to this state and 6480 state.
6480	1^+[†]	0	
6820	1^+[†]		
7120	1^+[†]		
7460	1^+[†]		
7730	1^+[†]		
7990	1^+[†]	0	E(level): E(level)=8100 *300* in 1983Ra30 corresponds to this state and 8290 state.
8290	1^+[†]	0	
8790	1^+[†]		
9030	1^+[†]	0	E(level): E(level)=9100 *300* in 1983Ra30 corresponds to this state and 9340 state.
9340	1^+[†]	0	
9680	1^+[†]		
10060	1^+[†]	0	E(level): E(level)=10000 *300* in 1983Ra30 corresponds to this state and 10230 state.
10230	1^+	0	T=1 component of the Gamow-Teller giant resonance. J^π: from the energy dependence of cross sections and angular distribution.
10500	1^+[†]		
11050		0	E(level): E(level)=11100 *300* in 1983Ra30 corresponds to this state and 11400 state.
11400		0	
11750			
12210			
13440		0	E(level): E(level)=13500 *300* in 1983Ra30 corresponds to this state.

[†] ΔL=0 excitation is interpreted as G-T transition (1990An06). Discrete states account for≤48% 12 of G-T giant-resonance strength.

[‡] Σ B(GT)=7.1 calculated using 1 MeV interval histogram and corresponding coefficients to transform $\sigma(0°)$ to B(GT) (1983Ra30).

[#] From 1990An06, except as noted.

[@] From 1971Ki17.

[&] From 1971Be46.