^{41}Ti εp decay (80.4 ms) 1997Ho12,1998Li46,1998Bh12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 140, 1 (2017)	30-Sep-2015

Parent: ^{41}Ti: E=0; $J^\pi=3/2^+$; $T_{1/2}$=80.4 ms *9*; Q(εp)=11860 *28*; %εp decay≈100.0

^{41}Ti-J^π,$T_{1/2}$: From Adopted Levels of ^{41}Ti.

^{41}Ti-Q(εp): From 2012Wa38.

^{41}Ti decays to ^{40}Ca by εp (≈100%).

1997Ho12: ^{41}Ti ions were produced by fusion reaction of E=40Mev ^{3}He beam on a 5 mg/cm^2 natural calcium target at the IGISOL facility. Reaction products were mass-separated and implanted into 30 μg/cm^2 carbon foil. Charged particles were detected with a telescope (FWHM<30 keV) of a gaseous ΔE detector (proportional counter) and a E detector (silicon surface-barrier detector). Another setup consisted of a plastic scintillator for beta detection, an ion-implanted silicon detector for beta and proton, a HPGe detector for γ rays. Measured E(p), I(p), pγ-coin, pβ-coin. Deduced levels. Report 6 proton groups from ^{41}Ti decay.

1998Li46: ^{41}Ti ions were produced by fragmentation of E=500 MeV/nucleon ^{58}Ni beam from the heavy-ion synchrotron SIS of GSI on a 4 g/cm^2 ^{9}Be target. Fragments were separated by the FRS separator, identified by energy loss in an ionization chamber (MUSIC) and mass-to-charge ratio from the time-of-flight (TOF) and the magnetic rigidity of the FRS and implanted into a stack of silicon detectors for detecting β-delayed protons; γ rays were detected with an array of 14 large-volume Crystal Ball NaI detectors. Measured E(p), I(p), pγ-coin, decay-time distribution. Deduced levels, parent $T_{1/2}$. Report 37 proton groups from ^{41}Ti decay.

1998Bh12: ^{41}Ti ions were produced at GANIL by fragmentation of a 82.6 MeV/nucleon ^{50}Cr beam on a 272.4 mg/cm^2 nickel target. Fragments were separated and selected by the LISE3 spectrometer and then implanted into a stack of five Si surface-barrier detectors. γ rays were detected with five HPGe detectors. Measured E(p), I(p), Eγ, Iγ, pγ-coin, pβ-coin, decay time distribution. Deduced levels, ^{41}Ti half-life. Report 29 proton groups from ^{41}Ti decay.

Other main references for measurement of E(p), I(p) from ^{41}Ti decay: 1985Zh05 (6 proton groups), 1974Se11 (17 proton groups), 1966Po12 (17 proton groups), 1964Re08 (6 proton groups).

Others: 2015Sh16, 1998Jo20, 1977Ce05, 1976Sz04, 1973Ha77, 1973Go06.

Additional information 1.

^{40}Ca Levels

E(level)†	J^π‡	Comments
0	0^+	
3353	0^+	
3737	3^-	
3904	2^+	E(level): from 1997Ho12.

† Rounded values from Adopted Levels.

‡ From Adopted Levels.

Delayed Protons (^{40}Ca)

E(p)†	E(^{40}Ca)	I(p)‡a	E(^{41}Sc)#	E(p)†	E(^{40}Ca)	I(p)‡a	E(^{41}Sc)#
754 *12*	3904	0.29 *13*	5774	2063&b *30*	3737	1.1 *2*	6938
986 *2*	0	5.6 *9*	2095	2271 *3*	0	5.0 *7*	3413
1249@b *15*	3737	1.05 *19*	6102	2414 *3*	0	3.4 *3*	3560
1249@b *15*	3904	1.05 *19*	6270	2.54×10^{3}b *13*	0	0.62 *12*	3690
1542 *2*	0	4.2 *13*	2666	2656 *7*	0	1.5 *3*	3808
1587 *10*	0	0.48 *23*	2712	2804 *8*	0	0.89 *20*	3960
1857 *28*	3904	0.8 *3*	6893	3083 *4*	0	15.8 *5*	4246
1977@b *10*	3353	0.56 *14*	6465	3152 *19*	0	0.80 *13*	4317
1977@b *10*	3904	0.56 *14*	7021	3343 *10*	0	0.60 *7*	4512

Continued on next page (footnotes at end of table)

^{41}Ti εp decay (80.4 ms) 1997Ho12,1998Li46,1998Bh12 (continued)

Delayed Protons (continued)

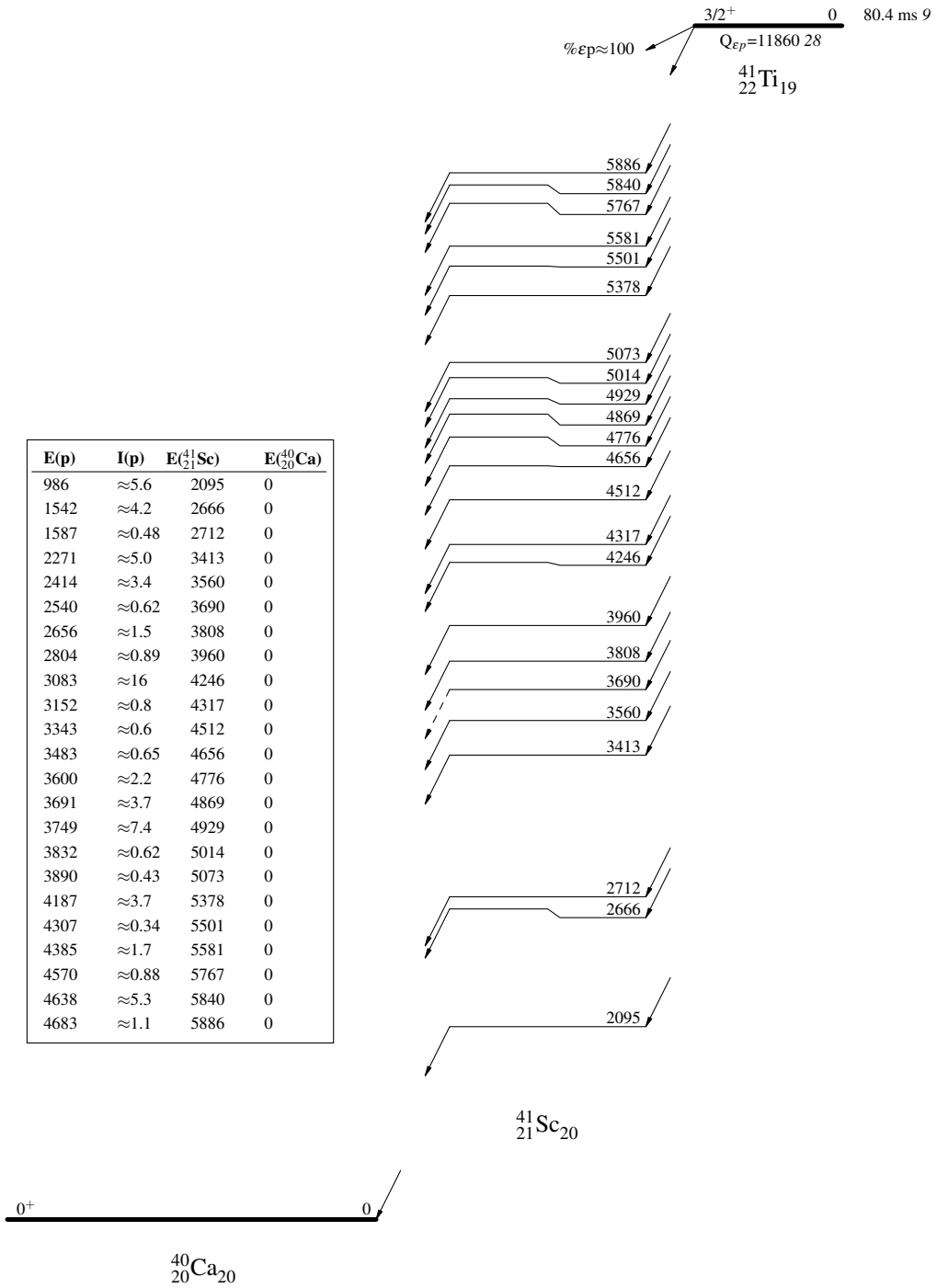
E(p)†	E(^{40}Ca)	I(p)‡[a]	E(^{41}Sc)#	E(p)†	E(^{40}Ca)	I(p)‡[a]	E(^{41}Sc)#
3483 *9*	0	0.65 *7*	4656	4876 *15*	0	0.84 *9*	6084
3600 *5*	0	2.15 *25*	4776	4944 *11*	0	0.76 *13*	6154
3691 *4*	0	3.7 *5*	4869	5157 *14*	0	0.40 *11*	6372
3749 *5*	0	7.4 *5*	4929	5219 *40*	0	0.65 *12*	6435
3832 *8*	0	0.62 *5*	5014	5337[b] *23*	0	0.37 *20*	6557
3890 *17*	0	0.43 *8*	5073	5441 *40*	0	0.60 *12*	6673
4187 *4*	0	3.72 *12*	5378	5601 *15*	0	0.065 *7*	6827
4307 *11*	0	0.34 *10*	5501	5718 *14*	0	0.094 *8*	6947
4385 *6*	0	1.69 *12*	5581	5790[b] *27*	0	0.56 *14*	7021
4570 *7*	0	0.88 *13*	5767	5947 *19*	0	0.102 *10*	7182
4638 *4*	0	5.3 *4*	5840	6121 *19*	0	0.072 *7*	7360
4683 *10*	0	1.06 *16*	5886	6371 *38*	0	0.050 *15*	7617
4735 *3*	0	25.0 *10*	5940	6650 *50*	0	0.050 *5*	7903
4829 *10*	0	0.8 *3*	6036	6725 *60*	0	0.07 *2*	7980

† E(p)(lab) values are from a weighted average of 1998Bh12, 1998Li46, 1997Ho12 and 1974Se11, except where noted.
‡ From weighted averages of 1998Li46, 1998Bh12, 1997Ho12, 1985Zh05, and 1974Se11.
# From ^{41}Ti ε decay (80.4 ms).
@ 1249 and 1977 proton groups are doubly placed.
& This group is not reported by 1997Ho12.
[a] For absolute intensity per 100 decays, multiply by ≈1.0.
[b] Placement of transition in the level scheme is uncertain.

^{41}Ti εp decay (80.4 ms) 1997Ho12,1998Li46,1998Bh12

Decay Scheme

I(p) Intensities: I(p) per 100 parent decays

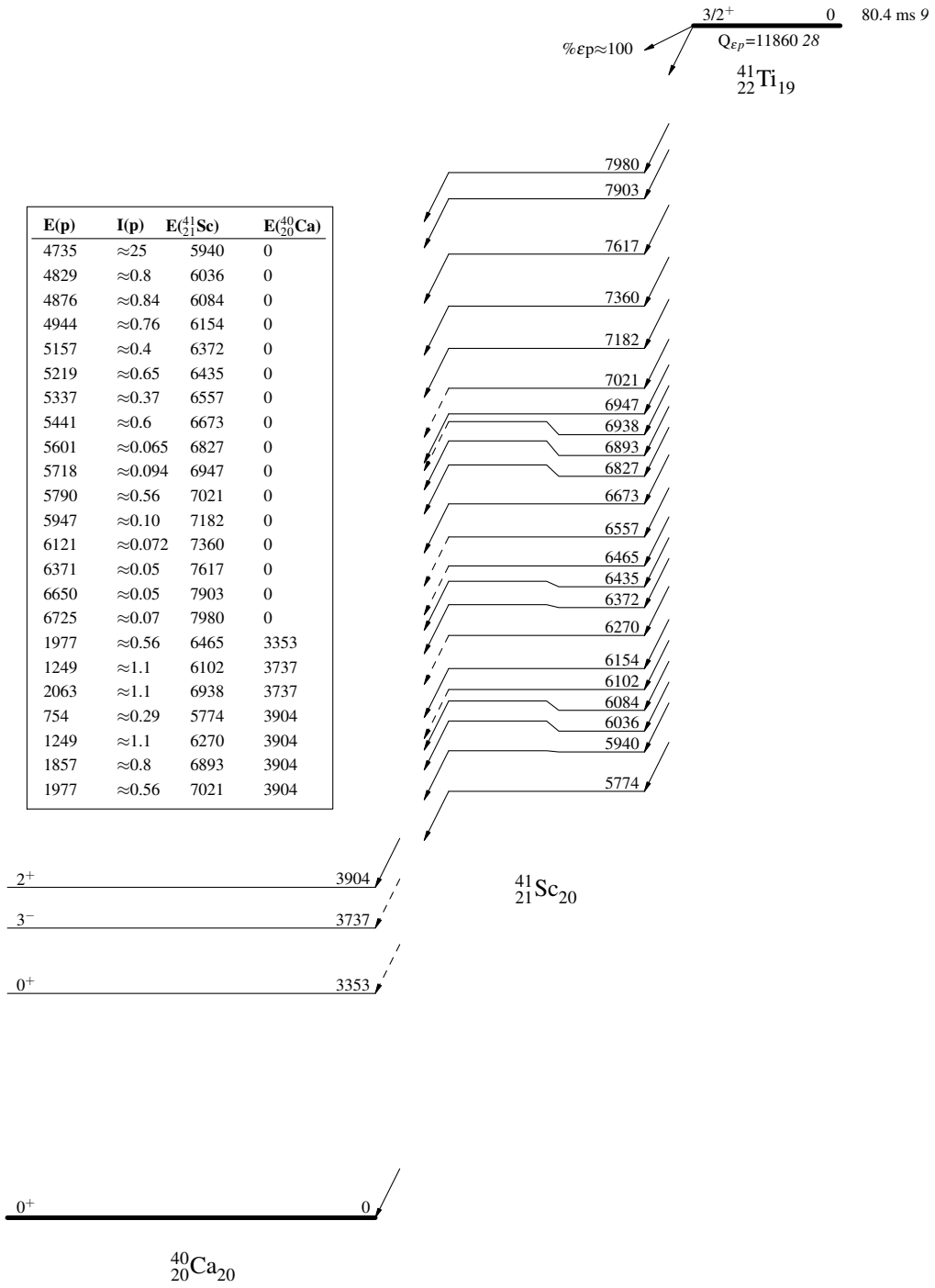


E(p)	I(p)	E($^{41}_{21}$Sc)	E($^{40}_{20}$Ca)
986	≈5.6	2095	0
1542	≈4.2	2666	0
1587	≈0.48	2712	0
2271	≈5.0	3413	0
2414	≈3.4	3560	0
2540	≈0.62	3690	0
2656	≈1.5	3808	0
2804	≈0.89	3960	0
3083	≈16	4246	0
3152	≈0.8	4317	0
3343	≈0.6	4512	0
3483	≈0.65	4656	0
3600	≈2.2	4776	0
3691	≈3.7	4869	0
3749	≈7.4	4929	0
3832	≈0.62	5014	0
3890	≈0.43	5073	0
4187	≈3.7	5378	0
4307	≈0.34	5501	0
4385	≈1.7	5581	0
4570	≈0.88	5767	0
4638	≈5.3	5840	0
4683	≈1.1	5886	0

^{41}Ti εp decay (80.4 ms) 1997Ho12,1998Li46,1998Bh12

Decay Scheme (continued)

I(p) Intensities: I(p) per 100 parent decays



E(p)	I(p)	E($^{41}_{21}$Sc)	E($^{40}_{20}$Ca)
4735	≈25	5940	0
4829	≈0.8	6036	0
4876	≈0.84	6084	0
4944	≈0.76	6154	0
5157	≈0.4	6372	0
5219	≈0.65	6435	0
5337	≈0.37	6557	0
5441	≈0.6	6673	0
5601	≈0.065	6827	0
5718	≈0.094	6947	0
5790	≈0.56	7021	0
5947	≈0.10	7182	0
6121	≈0.072	7360	0
6371	≈0.05	7617	0
6650	≈0.05	7903	0
6725	≈0.07	7980	0
1977	≈0.56	6465	3353
1249	≈1.1	6102	3737
2063	≈1.1	6938	3737
754	≈0.29	5774	3904
1249	≈1.1	6270	3904
1857	≈0.8	6893	3904
1977	≈0.56	7021	3904