^{54}Fe(p,p),(p,p′) res 1971Li14,1977Fl12

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Huo Junde	NDS 109, 787 (2008)	30-Apr-2007

1971Li14: E(p)=1.80-3.30 MeV; enriched (98% ^{54}Fe) targets, carbon backings; surface-barrier detectors; total energy resolution: 300-400 keV; barrier detectors; measured σ(E(p),θ); analyzed isolated resonances using single-level formula and overlapped resonances using multichannel and multilevel R-matrix expressions;

1975Br20: E(p)=3.25-4.33 MeV; energy resolution: 450 eV, enriched (96.8% ^{54}Fe) target, carbon backing; surface-barrier detectors for protons, NaI for γ(p′); measured σ(p,p′; θ); data were fitted with multichannel multilevel R-matrix program.

1977Fl12: E(p)=3.28-4.53 MeV; enriched (96.8% ^{54}Fe) target, carbon backing; overall energy resolution was about 350 eV; measured σ(E(p),θ); data were fitted with multichannel multilevel R-matrix formula.

1979Ar09: E(p)=3.25-4.0 MeV; enriched (97.6% ^{54}Fe) targets(<8 μg/cm^2), carbon backings(10-20 μg/cm^2); total resolution: 400 eV; measured σ(E(p),θ); data were fitted with multichannel multilevel R-matrix formula.

See also 1969Ah01.

^{55}Co Levels

E(β),T$_{1/2}$(β) From 1975Br20.

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	S[@]	Comments
S(p)+1801.7[&] *30*	(3/2$^-$)	15 eV *8*	0.04	E(level): ΔE(Coul.)=9016 keV *4* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(2052 level).
S(p)+1914.1 *30*	(1/2$^-$)	20 eV *10*		
S(p)+2212.5 *30*	(1/2$^-$)	30 eV *10*		
S(p)+2235.3 *30*	(1/2$^-$)	8 eV *5*		
S(p)+2243.1[&] *30*	3/2$^-$	225 eV *40*	0.09	E(level): ΔE(Coul.)=9031 keV *4* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(2471 level).
S(p)+2305.5 *30*	(1/2$^-$)	25 eV *10*		
S(p)+2358.4 *30*	1/2$^-$	60 eV *15*		
S(p)+2435.2 *30*	1/2$^-$	200 eV *35*		
S(p)+2436.3 *30*	1/2$^-$	40 eV *10*		
S(p)+2501.3 *30*	1/2$^-$	125 eV *25*		
S(p)+2547.5 *30*	1/2$^-$	180 eV *35*		
S(p)+2577.6 *30*	(3/2$^-$)	20 eV *10*		
S(p)+2604.8 *30*	5/2$^+$	35 eV *10*		
S(p)+2625.3 *3*	1/2$^-$	35 eV *10*		
S(p)+2645.6 *30*	(1/2$^-$)	25 eV *10*		
S(p)+2685.4 *30*	1/2$^-$	175 eV *40*		
S(p)+2730.2 *30*	(5/2$^+$)	25 eV *10*		
S(p)+2750.0[&] *30*	3/2$^-$	100 eV *20*	0.01	E(level): ΔE(Coul.)=8972 keV *4* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(3030 level).
S(p)+2750.9 *30*	1/2$^-$	650 eV *80*		
S(p)+2767.3 *30*	1/2$^+$	450 eV *50*		
S(p)+2799.7 *30*	1/2$^-$	75 eV *15*		
S(p)+2823.3 *30*	1/2$^-$	350 eV *50*		
S(p)+2863.2 *30*	5/2$^+$	180 eV *25*		
S(p)+2867.1 *30*	(3/2$^-$)	10 eV *5*		
S(p)+2944.5 *30*	1/2$^+$	10 eV *5*		
S(p)+2953.0 *30*	1/2$^-$	750 eV *100*		
S(p)+2954.9 *30*	5/2$^+$	200 eV *30*		
S(p)+3020.0 *30*	1/2$^-$	500 eV *60*		
S(p)+3020.5 *30*	1/2$^-$	200 eV *30*		
S(p)+3046.2 *30*	1/2$^-$	35 eV *10*		
S(p)+3056.3 *30*	3/2$^-$	250 eV *30*		

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^{54}Fe(p,p),(p,p′) res 1971Li14,1977Fl12 (continued)

^{55}Co Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	S[@]	Comments
S(p)+3056.7 *30*	3/2	100 eV *20*		
S(p)+3080.2 *30*	(3/2$^+$)	30 eV *10*		
S(p)+3096.3 *30*	(5/2$^-$)	8 eV *5*		
S(p)+3116.0 *30*	(1/2$^-$)	25 eV *10*		
S(p)+3121.9 *30*	5/2$^+$	1.2 keV *1*		
S(p)+3125.7 *30*	1/2$^-$	60 eV *15*		
S(p)+3136.4 *30*	1/2$^-$	70 eV *15*		
S(p)+3166.3 *30*	1/2$^-$	1.60 keV *12*		
S(p)+3183.5 *30*	1/2$^-$	40 eV *15*		
S(p)+3205.7 *30*	1/2$^+$	550 eV *60*		
S(p)+3209.0 *30*	(3/2$^+$)	15 eV *8*		
S(p)+3229.2 *30*	5/2$^+$	280 eV *35*		
S(p)+3277.0 *30*	3/2$^-$	40 eV *15*		
S(p)+3281.4 *30*	3/2$^-$	1.40 keV *15*		
S(p)+3283.2 *20*	3/2$^-$	20 eV *10*		
S(p)+3287.6[&] *20*	3/2$^-$	1.4 keV *2*	0.07	E(level): ΔE(Coul.)=8976 *6* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(3553 level).
S(p)+3294.9 *20*	1/2$^-$	300 eV *100*		
S(p)+3370.7 *20*	1/2$^-$,3/2$^-$	65 eV *15*		Jπ: J=1/2$^-$ from 1979Ar09; 3/2$^-$ from 1977Fl12 and 1975Br20.
S(p)+3381.4 *20*	1/2$^+$	145 eV *30*		
S(p)+3385.2 *20*	1/2$^-$	1.1 keV *2*		
S(p)+3386.5 *20*	5/2$^+$	260 eV *30*		
S(p)+3392.0 *20*	3/2$^-$	450 eV *100*		
S(p)+3414.1 *20*	1/2$^-$,3/2$^-$	50 eV *10*		Jπ: J=1/2$^-$ from 1979Ar09; 3/2$^-$ from 1977Fl12 and 1975Br20.
S(p)+3418.6 *20*	5/2$^+$	950 eV *150*		
S(p)+3433.5 *20*	3/2$^+$,(5/2$^+$)	28 eV *8*		Jπ: J=3/2$^+$ from 1979Ar09 and 1977Fl12; (5/2$^+$) from 1975Br20.
S(p)+3442.6 *20*	1/2$^-$,3/2$^-$	110 eV *15*		Jπ: J=1/2$^-$ from 1979Ar09; 3/2$^-$ from 1977Fl12 and 1975Br20.
S(p)+3455.4 *20*	3/2$^+$,(5/2$^+$)	47 eV *10*		Jπ: J=3/2$^+$ from 1979Ar09 and 1977Fl12; (5/2$^+$) from 1975Br20.
S(p)+3466.6[&] *20*	(5/2$^+$),9/2$^+$	78 eV *6*	0.58	E(level): ΔE(Coul.)=8889 *12* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(3814 level). Jπ: J=(5/2$^+$) from 1975Br20; 9/2$^+$ from 1979Ar09 and 1977Fl12.
S(p)+3472.0[&] *20*	1/2$^-$	11 keV *1*	0.53	E(level): 1979Ar09. ΔE(Coul.)=8923 *5* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(3791 level).
S(p)+3476.3 *20*	9/2$^+$	6 eV *2*		
S(p)+3492.8 *20*	1/2$^-$	4.5 keV *5*		
S(p)+3502.6 *20*	3/2$^-$	220 eV *22*		
S(p)+3506.3 *20*	5/2$^+$	18 eV *5*		
S(p)+3565.3 *20*	1/2$^-$,3/2$^-$	80 eV *25*		Jπ: J=1/2$^-$ from 1977Fl12 and 1975Br20; 3/2$^-$ from 1979Ar09.
S(p)+3566.8 *20*	3/2$^-$	475 eV *50*		
S(p)+3569.0 *20*	1/2$^+$	60 eV *13*		
S(p)+3575.4 *20*	3/2$^-$	45 eV *5*		
S(p)+3582.6 *20*	5/2$^+$	80 eV *10*		
S(p)+3629.2 *20*	3/2$^-$	70 eV *15*		
S(p)+3644.3 *20*	5/2$^+$	195 eV *15*		
S(p)+3650.7 *20*	3/2$^+$	180 eV *20*		
S(p)+3660.8 *20*	1/2$^-$	80 eV *15*		
S(p)+3663.9 *20*	1/2$^-$,3/2$^-$	120 eV *20*		Jπ: J=1/2$^-$ from 1979Ar09; 3/2$^-$ from 1977Fl12 and 1975Br20.
S(p)+3669.4 *20*	(3/2$^+$)	14.9 eV		E(level): 1979Ar09.
S(p)+3680.6 *20*	1/2$^+$	3.4 keV *2*		
S(p)+3691.1 *20*	3/2$^+$,5/2$^+$	150 eV *20*		Jπ: J=3/2 from 1979Ar09 and 1975Br20; 5/2$^+$ from 1977Fl12.
S(p)+3723.2 *20*	1/2$^+$	310 eV *30*		
S(p)+3727.7 *20*	(5/2$^+$)	6 eV *4*		
S(p)+3748.4 *20*	3/2$^-$	700 eV *70*		
S(p)+3748.7 *20*	5/2$^+$	365 eV *40*		
S(p)+3752.3 *20*	5/2$^-$	15 eV *4*		

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^{54}Fe(p,p),(p,p′) res 1971Li14,1977Fl12 (continued)

^{55}Co Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	S[@]	Comments
S(p)+3755.6 *20*	3/2+	20 eV *8*		
S(p)+3756.7 *20*	5/2−	32 eV *6*		
S(p)+3777.0 *20*	1/2+	1.00 keV *12*		
S(p)+3801.9 *20*	3/2−	350 eV *50*		
S(p)+3804.1[&] *20*	5/2+	484 eV *7*	0.04	E(level): 1979Ar09. ΔE(Coul.)=9007 *15* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(4028 level).
S(p)+3806.2 *20*	5/2+	500 eV *50*		
S(p)+3807.4 *20*	3/2−	700 eV *70*		
S(p)+3818.3 *20*	5/2+	775 eV *70*		
S(p)+3829.5 *20*	5/2−,(7/2−)	40 eV *8*		Jπ: J=5/2− from 1979Ar09 and 1977Fl12; (7/2−) from 1975Br20.
S(p)+3839.6 *20*	5/2−,(7/2−)	14 eV *4*		Jπ: J=5/2− from 1979Ar09 and 1977Fl12; (7/2−) from 1975Br20.
S(p)+3849.7 *20*	1/2−	850 eV *80*		
S(p)+3859.7 *20*	5/2−	16 eV *4*		
S(p)+3861.0 *20*	5/2+	20 eV *10*		
S(p)+3885.1 *20*	3/2−	500 eV *70*		
S(p)+3889.2 *20*	5/2+	23 eV *10*		
S(p)+3892.2 *20*	5/2+	180 eV *20*		
S(p)+3901.5 *20*	1/2+	1.40 keV *15*		
S(p)+3904.1 *20*	1/2−	0.50 keV *15*		
S(p)+3919.2 *20*	5/2+	380 eV *35*		
S(p)+3924.4 *20*	(5/2+)	6 eV *5*		
S(p)+3927.8 *20*	(5/2+)	8 eV *6*		
S(p)+3941.7 *20*	3/2+	45 eV *15*		
S(p)+3944.2 *20*	(1/2−)	120 eV *20*		
S(p)+3947.9 *20*	3/2−	98 eV *15*		
S(p)+3960.3 *20*	5/2+	320 eV *30*		
S(p)+3969.2 *20*	1/2−,3/2−	170 eV *50*		Jπ: J=1/2− from 1979Ar09; 3/2− from 1977Fl12 and 1975Br20.
S(p)+3970.8 *20*	(3/2+),5/2+	250 eV *70*		Jπ: J=(3/2+) from 1977Fl12; 5/2+ from 1979Ar09 and 1975Br20.
S(p)+3989.0 *20*	1/2+	17.0 keV *17*		
S(p)+3997.4 *20*	3/2+	400 eV *40*		
S(p)+4011.4 *20*	5/2+	1.20 keV *12*		
S(p)+4014.9 *20*	3/2+,5/2+	110 eV *20*		Jπ: J=3/2+ from 1977Fl12 and 1975Br20; 5/2+ from 1979Ar09.
S(p)+4028.6 *20*	1/2+	3.50 keV *35*		
S(p)+4039.3 *20*		25 eV *10*		Jπ: J=1/2+ from 1975Br20; 3/2− from 1977Fl12.
S(p)+4053.0 *20*	3/2−	180 eV *20*		
S(p)+4055.1 *20*	(1/2−)	160 eV *20*		
S(p)+4062.3 *20*	3/2+,5/2+	450 eV *45*		Jπ: J=3/2+ from 1977Fl12; 5/2+ from 1975Br20.
S(p)+4072.7 *20*	5/2+	0.7 keV *1*		
S(p)+4083.3 *20*	5/2+	0.65 keV *10*		
S(p)+4086.7 *20*	1/2+	19 keV *2*		
S(p)+4094.7 *20*	(5/2−)	15 eV *5*		
S(p)+4100.7 *20*	3/2−	0.50 keV *7*		
S(p)+4115.1 *20*	(9/2+)	10 eV *5*		
S(p)+4120.7 *20*	1/2+	29 keV *3*		
S(p)+4135.0[&] *20*	5/2+	5.25 keV *50*	0.15	E(level): ΔE(Coul.)=8892 *12* in ^{55}Fe-^{55}Co pair; IAS of ^{55}Fe(4463 level).
S(p)+4149.9 *20*	5/2+	180 eV *20*		
S(p)+4155.8 *20*	3/2+,(5/2+)	35 eV *10*		Jπ: J=3/2+ from 1977Fl12; (5/2+) from 1975Br20.
S(p)+4180.9 *20*	1/2+	2.80 keV *28*		
S(p)+4190.8 *20*	(5/2+)	15 eV *8*		
S(p)+4194.6 *20*	(3/2−)	70 eV *20*		
S(p)+4201.9 *20*	1/2+	2.50 keV *25*		
S(p)+4205.9 *20*	3/2+	1.10 keV *11*		
S(p)+4217.7 *20*	3/2−	150 eV *50*		
S(p)+4220.8 *20*	1/2−	4.0 keV *4*		

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^{54}Fe(p,p),(p,p′) res 1971Li14,1977Fl12 (continued)

^{55}Co Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	Comments
S(p)+4225.6 *20*	(5/2$^+$)	30 eV *10*	
S(p)+4229.5 *20*	1/2$^+$	0.8 keV *1*	
S(p)+4237.5 *20*	3/2$^-$,(9/2$^+$)	8 eV *7*	Jπ: J=3/2$^-$ from 1975Br20; (9/2$^+$) from 1977Fl12.
S(p)+4243.2? *5*			E(level): 1975Br20.
S(p)+4250.0 *20*	3/2$^-$	1.00 keV *15*	
S(p)+4254.4 *20*	3/2$^+$,(5/2$^+$)	275 eV *30*	Jπ: J=3/2$^+$ from 1977Fl12; (5/2$^+$) from 1975Br20.
S(p)+4256.5 *20*	5/2$^-$	18 eV *5*	
S(p)+4259.7 *20*	5/2$^+$	275 eV *50*	
S(p)+4264.2 *20*	1/2$^-$	4.0 keV *7*	
S(p)+4270.9 *20*	(3/2$^+$)	120 eV *60*	
S(p)+4276.7 *20*	1/2$^-$	1.9 keV *5*	
S(p)+4286.8 *20*	1/2$^+$	70 eV *10*	
S(p)+4292.0 *20*	(3/2$^+$),5/2$^+$	60 eV *6*	Jπ: J=(3/2$^+$) from 1975Br20; 5/2$^+$ from 1977Fl12.
S(p)+4303.9 *20*	3/2$^-$	1.8 keV *2*	
S(p)+4304.3 *20*	5/2$^+$	170 eV *50*	
S(p)+4306.8 *20*	3/2$^+$	2.6 keV *3*	
S(p)+4315.4 *20*	5/2$^+$	300 eV *30*	
S(p)+4316.4 *20*	1/2$^-$	2.0 keV *3*	
S(p)+4326.0 *20*	3/2$^-$	75 eV *20*	
S(p)+4343.0 *20*	5/2$^-$	70 eV *7*	
S(p)+4352.0 *20*	3/2$^-$	550 eV *55*	
S(p)+4359.3 *20*	5/2$^+$	150 eV *20*	
S(p)+4373.3 *20*	3/2$^-$	90 eV *9*	
S(p)+4377.3 *20*	3/2$^+$	180 eV *18*	
S(p)+4387.2 *20*	1/2$^-$	0.90 keV *9*	
S(p)+4393.8 *20*	1/2$^+$	165 eV *17*	
S(p)+4397.7 *20*	(5/2$^+$)	30 eV *10*	
S(p)+4405.1 *20*	3/2$^-$	95 eV *15*	
S(p)+4413.0 *20*	1/2$^+$,(5/2$^+$)	0.13 keV *5*	Jπ: J=1/2$^+$ from 1975Br20; (5/2$^+$) from 1977Fl12.
S(p)+4415.6 *20*	1/2$^+$	3.55 keV *50*	
S(p)+4433.7 *20*	3/2$^+$	0.40 keV *5*	
S(p)+4440.3 *20*	5/2$^+$	0.4 keV *1*	
S(p)+4444.9 *20*	5/2$^+$	110 eV *12*	
S(p)+4463.7 *20*	1/2$^+$,3/2$^-$	1.5 keV *3*	Jπ: J=1/2$^+$ from 1975Br20; 3/2$^-$ from 1977Fl12.
S(p)+4464.3 *20*	(3/2$^+$)	0.20 keV *6*	
S(p)+4469.3 *20*	(3/2$^+$)	0.90 keV *15*	
S(p)+4470.6 *20*	(5/2$^-$)	60 eV *30*	
S(p)+4474.1 *20*	(5/2$^+$)	20 eV *10*	
S(p)+4502.3 *20*	3/2$^-$	0.40 keV *5*	
S(p)+4503.1 *20*	5/2$^+$	100 eV *10*	
S(p)+4509.8 *20*	3/2$^-$	100 eV *15*	
S(p)+4513.8 *20*	5/2$^-$	25 eV *10*	
S(p)+4522.3 *20*	(1/2$^-$)	1.0 keV *3*	
S(p)+4527.3 *20*	1/2$^+$	5.0 keV *7*	
S(p)+4576.0 *20*	1/2$^+$	1.5 keV	
S(p)+4671.0 *5*	1/2$^+$	20 keV	
S(p)+4748.0 *5*	1/2$^+$	1.5 keV	
S(p)+4830.0 *5*	1/2$^+$	50 keV	

† From 1971Li14 (when E(p)<3282 keV) and 1977Fl12 (when E(p)>3282 keV), except as noted. E(level)=S(p)+E(p)(lab); S(p)=5064.07 *33* from 2003Au03.

‡ Mainly from 1971Li14 and 1977Fl12, except as noted. Evaluator notes that differences between cross sections for J=L+1/2 and J=L−1/2 are not significant. So Jπ assignments for L=1,2,3 are regarded as uncertain.

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^{54}Fe(p,p),(p,p′) res 1971Li14,1977Fl12 (continued)

^{55}Co Levels (continued)

Γ_p from 1971Li14 and 1977Fl12, except as noted.

@ S(p,p)=(2T+1)Γ_p/Γ(s.p.); T is isospin of ^{54}Fe g.s., Γ_p is total Γ of analog (sum of proton partial widths), Γ(s.p.) is single-particle Γ.

& Identified as isobaric analog state of ^{55}Fe.