^{50}Cr(p,p), (p,p′γ), (p,γ) IAR 1988Di03,1988Ca05,1986Di01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Wang Jimin and Huang Xiaolong	NDS 144, 1 (2017)	1-Mar-2016

Others: 1971Mo28, 1977Sa08, 1983Ar10.
1988Di03: E=2.5-3.1 MeV.
1988Ca05: E=1.05-1.52 MeV.
1986Di01: E=1.7-2.5 MeV.
1971Mo28: E=1.8-3.3 MeV.
1977Sa08: E=3.2-4.4 MeV.
1983Ar10: E=3.15-4 MeV.
Measured γ(E(p),Eγ,θ), res and IAR analysis in these experiments.
Only IAR levels for ^{51}Cr-^{51}Mn are given here;
In unbound states excited by E(p)=1.8-4.4 MeV, 302 more states were observed apart from IAR states.

^{51}Mn Levels

For resonance Γ measurements, see 1971Mo28 (E(p)=2133,2233,2329,2967,3147,3187), 1977Sa08, 1983Ar10, and 1984Sz02 (E(p)=3246,3259,3266).

Proposed isobaric analog states in ^{51}Cr-^{51}Mn are primarily from ^{50}Cr(^{3}He,d), ^{50}Cr(p,γ), and ^{48}Ti(α,nγ) experiments.
E: E(level) for ^{51}Mn are from S(p)+E(p)(c.m.), where S(p)=5270.8 keV *3* (2017Wa10), E(p) is proton resonance energy in lab system.
J: assignments of spin and parity for resonance states of ^{51}Mn are based on resonance decay analysis and primary γ(θ) to final states with known J^{π}.

Proposed isobaric analog states in ^{51}Cr-^{51}Mn

^{51}Cr		^{51}Mn		Coulomb Energy Shift	References	Ep keV
Ex, keV	J^{π}	Ex, keV	J^{π}			
0.0	7/2⁻	4450	7/2⁻	8402	1967Ra14,1986Di01	
749	3/2⁻	5125	3/2⁻	8368	1967Ra14,1986Di01	
777	1/2⁻	5074	1/2⁻	8298	1967Ra14,1986Di01	
1353	5/2⁻				1988Ca05	
1557	7/2⁻				1988Ca05	
1899	3/2⁻	6309	3/2⁻	8402	1988Ca05	1059
2002	5/2⁻	6451	5/2⁻	8440	1988Ca05	1204
2313	7/2⁻	6754 d	5/2-? d	8432	1988Ca05	1513
2699	5/2⁻,7/2⁻	7106	5/2⁻,7/2⁻	8394	1986Di01	1872
2763	1/2⁺	7176	1/2⁺	8405	1986Di01,1967Er05	1943
2829	3/2⁻	7274	3/2⁻	8435	1986Di01,1967Er05	2043
		7296	3/2⁻	8457	1986Di01	2066
2890	3/2⁻	7314	(1/2,3/2)	8416	1986Di01,1971Mo28	2084
		7339	(1/2,3/2)	8441	1986Di01,1971Mo28	2110
		7343	3/2⁻	8443	1986Di01,1967Er05	2114
2911	3/2,5/2⁻,7/2⁻	7357	5/2⁻	8436	1986Di01	2128
2948	5/2⁻,7/2⁻	7395	3/2⁻,5/2⁻	8436	1986Di01	2167
2970	3/2⁺,5/2⁺	7415	5/2⁺	8435	1986Di01	2187
3002	5/2⁻	7447 d	3/2-? d	8435	1986Di01	2220
3004	3/2⁺	7450 d	3/2-? d	8435	1986Di01	2223

3016	$5/2^+$	7459	$5/2^+$	8429	1986Di01	2232
3056	$1/2^-$	7467	$1/2^-$	8402	1986Di01	2240
3109	$7/2^-$					
3126	$3/2^-$	7560	$3/2^-,5/2^-$	8441	1986Di01,1971Mo28	
2335						
3135	$(3/2^-)$	7586	1/2,3/2	8441	1986Di01	2362
3204	$5/2^-,7/2^-$	7669	(5/2,7/2)	8452	1986Di01	2446
3263	$3/2^-$	7715	$3/2^-$	8442	1988Di03	2493
		7718	$1/2^-,3/2,5/2^-$	8445	1988Di03	2496
3351	$3/2^-$ to $7/2^-$	7786	$5/2^-$	8426	1988Di03,1971Mo28	
2566						
		7791	$5/2^-$	8431	1988Di03,1977Sa08	
2571						
3719	$1/2^+$	7798?	$1/2^+$	8441	1988Di03	2578
3767	$1/2^-,3/2^-$	8199	$(3/2^-)$	8424	1988Di03	2987
3771	$1/2^-,3/2^-$	8216	$(3/2^-)$	8439	1988Di03	3004
3900	$5/2^+$	8282	$5/2^+$	8371	1988Di03	3071
3927	$5/2^+$	8307	$5/2^+$	8370	1988Di03	3097
3953	$5/2^+$	8336	$5/2^+$	8372	1988Di03	3126
3985	$5/2^+$	8340	$5/2^+$	8384	1988Di03,1984Sz02	
3131						
3977	$3/2^+,5/2^+$	8352	$5/2^+$	9365	1988Di03	3143
		8358	$5/2^+$	8371	1988Di03,1983Ar10	
3149						
3990	$3/2^+,5/2^+$	8389	$3/2^+$	8384	1988Di03,1984Sz02	
3181						
4005	$5/2^-,7/2^-$	8391	$5/2^-$	8371	1988Di03,1984Sz02	
3183						
4040	$1/2^-$	8403	1/2	8348	1988Di03,1977Sa08	
3195						
4071	$3/2^+,5/2^+$	8408	$5/2^+$	8322	1988Di03,1984Sz02	
3200						
4099	$7/2^+,9/2^+$	8453	$9/2^+$	8273	1988Di03,1984Sz02	
3246						
4155	$7/2^+,9/2^+$	8466	$9/2^+$	8294	1988Di03,1984Sz02	
3259						
4189	$3/2^+,5/2^+$	8491	$5/2^+$	8300	1988Di03,1984Sz02	
3285						
4258	$3/2^+,5/2^+$	8492	$5/2^+$	8253	1988Di03,1983Ar10	
3286						
4289	$1/2^+,3/2^+$	8749	$1/2^+$	8456	1977Sa08	3548
4426	$1/2^-,3/2^-$	8893	$1/2^-$	8458	1977Sa08	3695
4609	$1/2^+$	8915	$1/2^+$	8291	1977Sa08	3717
4770	$1/2^-,3/2^-$	9186	$3/2^-$	8410	1977Sa08	3993
5205	$1/2^-,3/2^-$	9515	$1/2^-$	8291	1977Sa08	4329
5222	$1/2^-,3/2^-$	9516	$1/2^-$	8292	1977Sa08	4330

d, assignment as IAS must be wrong.

E(level)†	Jπ‡	Comments
S(p)+2091.2 *30*	$3/2^-$	Γ_{p0}=340 eV *50* (1971Mo28) E(level): IAR of $3/2^-$ 2890 in ^{51}Cr and ΔE(Coul.)=8463 keV *5* (1971Mo28).
S(p)+2189.7 *30*	$1/2^-$	Γ_{p0}=380 eV *50* (1971Mo28) E(level): IAR of $1/2^-$ 3056 in ^{51}Cr and ΔE(Coul.)=8399 keV *8* (1971Mo28).
S(p)+2283.6 *30*	$3/2^-$	Γ_{p0}=550 keV *55* (1971Mo28) E(level): IAR of $3/2^-$ 3126 in ^{51}Cr and ΔE(Coul.)=8421 keV *4* (1971Mo28).
S(p)+2519.6	$5/2^-$	E(level): IAR of $5/2^-$ 3351 in ^{51}Cr and ΔE(Coul.)=8430 keV (1977Sa08).
S(p)+2908.8	$3/2^-$	Γ_{p0}=1495 eV (1971Mo28) E(level): IAR of $1/2^-,3/2^-$ 3771 in ^{51}Cr and ΔE(Coul.)=8402 keV *10* (1971Mo28).
S(p)+3085.0 *30*	$5/2^+$	Γ_{p0}=1250 eV *150* (1971Mo28) E(level): IAR of $3/2^+,5/2^+$ 3977 in ^{51}Cr and ΔE(Coul.)=8415 keV (1983Ar10).
S(p)+3124.7 *30*	$1/2^-$	Γ_{p0}=3250 eV *350* (1971Mo28) E(level): IAR of $1/2^-$ 4040 in ^{51}Cr and ΔE(Coul.)=8334 keV (1983Ar10).

S(p)+3182.4	$9/2^+$	Γ_{p0}=10.0 eV (1977Sa08), 8.8 eV (1983Ar10), 5.5 eV (1984Sz02); Γ_{p1}=30 eV (1977Sa08), 12.0 eV (1983Ar10), 17.3 eV (1984Sz02). E(level): IAR of $7/2^+$,$9/2^+$ 4099 in ^{51}Cr and ΔE(Coul.)=8339 keV (1983Ar10).
S(p)+3195.1	$9/2^+$	Γ_{p0}=18.0 eV (1977Sa08), 8.9 eV (1984Sz02); Γ_{p1}=36 eV (1977Sa08), 175.2 eV (1984Sz02). E(level): IAR of $7/2^+$,$9/2^+$ 4155 in ^{51}Cr and ΔE(Coul.)=8308 keV (1983Ar10).
S(p)+3202	$9/2^+$	E(level): from 1977Sa08 only. Γ_{p0}=8.0 eV (1977Sa08), 11.0 eV (1984Sz02), 6.4 eV (1983Ar10); Γ_{p1}=12.0 eV (1977Sa08), 9.6 eV (1983Ar10), 3.6 eV (1984Sz02).
S(p)+3220.3	$5/2^+$	E(level): IAR of $3/2^+$,$5/2^+$ 4071 in ^{51}Cr and ΔE(Coul.)=8318 keV (1983Ar10).
S(p)+3276.5	$5/2^-$	E(level): IAR of $5/2^-$,$7/2^-$ 4005 in ^{51}Cr and ΔE(Coul.)=8536 keV (1977Sa08).
S(p)+3476.6	$1/2^+$	E(level): IAR of $1/2^+$,$3/2^+$ 4289 in ^{51}Cr and ΔE(Coul.)=8456 keV (1977Sa08).
S(p)+3622.3	$1/2^-$	E(level): IAR of $1/2^-$,$3/2^-$ 4426 in ^{51}Cr and ΔE(Coul.)=8458 keV (1977Sa08).
S(p)+3644.1	$1/2^+$	E(level): IAR of $1/2^+$ 4609 in ^{51}Cr and ΔE(Coul.)=8291 keV (1977Sa08).
S(p)+3914.7	$3/2^-$	E(level): IAR of $1/2^-$,$3/2^-$ 4770 in ^{51}Cr and ΔE(Coul.)=8410 keV (1977Sa08).

Continued on next page (footnotes at end of table)

^{50}Cr(p,p), (p,p′γ), (p,γ) IAR 1988Di03,1988Ca05,1986Di01 (continued)

^{51}Mn Levels (continued)

E(level)†	Jπ‡	Comments
S(p)+4244.7	1/2$^-$	E(level): IAR of 1/2$^-$,3/2$^-$ 5205 or 5222 in ^{51}Cr and ΔE(Coul.)=8291 keV (1977Sa08).
S(p)+5932.4	5/2$^+$	Γ=8.30 keV, Γ_{p0}=3.50 keV, Γ_{p2}=2.13 keV, Γx=2.67 keV (1986Sh34).

† E(level)=S(p)+E(p)(c.m.), where S(p)=5270.8 keV *3* (2017Wa10), E(p)(c.m.)=E(p)(lab)(50/51), E(p)(lab) is proton energy in lab system taken from 1983Ar10, 1977Sa08, and 1971Mo28.

‡ Based on res and IAR analysis.