

$^{20}\text{Ne}({}^3\text{He,p}),({}^3\text{He,p}\gamma)$ 1970OI03,1971Ga04

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 127, 69(2015)	1-Apr-2015

$J^\pi(^{20}\text{Ne})=0^+$.

Others: 1966Ma23,1967Me15,1967Po10,1967Wa13,1971Be19,1971Me01.

1970OI03: $^{20}\text{Ne}({}^3\text{He,p}\gamma)$ E=6.92 MeV. Measured $\sigma(E);E\gamma,\theta(\gamma)$, $\gamma\gamma$ coincidence, Doppler shift attenuation.

1971Ga04: $^{20}\text{Ne}({}^3\text{He,p}\gamma)$ E=15 MeV. Protons were registered with emulsions. Magnetic spectrograph, measured proton spectrum, $\sigma(\theta)$, deduced excited level energies, L.

1971Be19: $^{20}\text{Ne}({}^3\text{He,p})$ E=15-18 MeV. Measured $\sigma(\theta)$, multi-angle spectrograph.

1966Ma23: $^{20}\text{Ne}({}^3\text{He,p}\gamma)$ E=5.35 MeV. Measured $E\gamma$, $\gamma\gamma$ - and $p\gamma$ -coincidence, $\sigma(E\gamma,\theta)$. Natural target.

 ^{22}Na Levels

E(level) #	J^π @	L #	Comments
0.0	3 ⁺	(2)	
586 4	1 ⁺	0+(2)	
658 4	0 ⁺	0	T=1
893 4	4 ⁺	(4)	
1529 4	5 ⁺	4	
1939 4	1 ⁺	0+2	
1952	2 ⁺		
1986 10	3 ⁺	4	
2214 4	1 ⁻	(1)	
2574 4	2 ⁻		
2970 4	3 ⁺	2	
3061 4	2 ⁺		
3521 [‡] 2	(3 ⁻)	(3)	
3708 [‡] 1			
3944 [‡] 2	1 ⁺	0+2	
4069 [‡] 2		(4)	
4294 [‡] 2			
4319 [‡] 2	1 ⁺	0+(2)	
4360 [‡] 2	2 ⁺		
4468 4			
4526 4			
4583 [‡] 2			
4622 [‡] 2	1		
4708 [‡] 3		(4)	
4770 [‡] 2			
5061 [‡] 2	(2 ⁺)		
5097 10			
5130 10			
5165 [‡] 4			
5317 7		(2)	
5440 7			
5605 7			
5752 7		0(+2)	
5830 7			
5858 10			
5918 7			
5958 10			
5995 10			

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$^{20}\text{Ne}(\text{}^3\text{He,p}),(\text{}^3\text{He,p}\gamma)$ **1970OI03,1971Ga04** (continued) ^{22}Na Levels (continued)

<u>E(level)[#]</u>	<u>L[#]</u>	<u>E(level)[#]</u>	<u>E(level)[#]</u>	<u>E(level)[#]</u>
6088 7		7242? 7	8198 10	9195 10
6185 7		7278 7	8323 10	9240 10
6247 7		7367 7	8367 10	9312 10
6326 7		7413 7	8417 10	9360 10
6437 7		7512 7	8497 10	9438 10
6521 7		7543 10	8525 10	9527 10
6557 7		7575 10	8573 10	9582 [†] 10
6582 7		7595 10	8602 10	9647 10
6664 7	(2)	7633 10	8674 10	9682 10
6715 7		7682 7	8726 [†] 10	9756 10
6750 7		7806 10	8794 15	9794 10
6834 7	0	7884 7	8841 15	9859 10
6862 7		7942 7	8874 10	9908 10
6961 7		7963 7	8950 10	9957 [†] 10
7008 7		8026 10	9008 10	10009 [†] 10
7081? 7		8100 10	9051 10	10051 [†] 10
7153 7		8128 10	9122 10	10118 10
7220 7		8157 10	9150 10	10167 10

[†] Possible doublet.[‡] From [1970OI03](#).# From [1971Ga04](#), except as noted.@ From Adopted Levels. Added by evaluator for γ -ray multiplicities, reported in references of this dataset. $\gamma(^{22}\text{Na})$

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ[†]</u>	<u>I_γ[†]</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>δ[‡]</u>	<u>Comments</u>
586	1 ⁺	586	100	0.0	3 ⁺			
658	0 ⁺	72	100	586	1 ⁺			
893	4 ⁺	893	100	0.0	3 ⁺	M1+E2	1.7 9	Mult.: From 1966Ma23 .
1529	5 ⁺	1529	100	0.0	3 ⁺			
1952	2 ⁺	1366	100	586	1 ⁺	M1		Mult.: A ₂ =-0.22 5, A ₄ =0.07 2, Pol(90)=-0.30 12 (1970OI03).
2214	1 ⁻	1556	100	658	0 ⁺	E1		Mult.: A ₂ =-0.76 3, A ₄ =-0.26 6, Pol(90)=1.17 34 (1970OI03).
2574	2 ⁻	1916	18	658	0 ⁺			
		2574	100	0.0	3 ⁺	E1+M2	-0.08 5	Mult.: From 1966Ma23 . δ: Or 4.7 10 (1966Ma23).
2970	3 ⁺	1018	100	1952	2 ⁺	M1		Mult.: A ₂ =-0.37 11, A ₄ =0.26 6, Pol(90)=-1.01 34 (1970OI03).
3061	2 ⁺	1109	100	1952	2 ⁺	M1		Mult.: A ₂ =0.21 5, A ₄ =-0.16 5, Pol(90)=0.61 21 (1970OI03).
3521	(3 ⁻)	947 2	20 5	2574	2 ⁻			
		1307 2	55 8	2214	1 ⁻	E2(+M3)	-0.04 [#] 12	
		1569 2	100 13	1952	2 ⁺	E1(+M2)	-0.02 [#] 11	
		2628 2	20 5	893	4 ⁺			
		3521 2	55 10	0.0	3 ⁺			
3708		2179 1	54 15	1529	5 ⁺			
		2815 1	100 15	893	4 ⁺			
3944	1 ⁺	1992 2	8 1	1952	2 ⁺			

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$^{20}\text{Ne}({}^3\text{He,p}),({}^3\text{He,p}\gamma)$ 1970OI03,1971Ga04 (continued) $\gamma(^{22}\text{Na})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult.	δ^\ddagger	Comments
3944	1 ⁺	3286 2	100 1	658	0 ⁺	D		Mult.: $A_2=-0.37$ 2, $A_4=0.00$ 2.
4069		2083 2	100	1986	3 ⁺			
4294		1720 2	67 17	2574	2 ⁻			
		2355 2	100 17	1939	1 ⁺			
4319	1 ⁺	3661 2	100	658	0 ⁺	M1		Mult.: $A_2=0.16$ 5, $A_4=0.00$ 5.
4360	2 ⁺	2408	100 5	1952	2 ⁺	M1(+E2)	+0.02 [#] 3	Mult.: $A_2=-0.35$ 5, $A_4=0.03$ 5.
		3774	8 4	586	1 ⁺	M1(+E2)		Mult.: $A_2=-0.46$ 4, $A_4=0.13$ 4.
		4360	24 4	0.0	3 ⁺			
4583		2631 2	100 14	1952	2 ⁺			
		4582 2	43 14	0.0	3 ⁺			
4622	1	2670 2	100 20	1952	2 ⁺			
		3964 2	67 20	658	0 ⁺	D		Mult.: $A_2=-0.36$ 4, $A_4=0.01$ 3.
4708		639 3	67 17	4069				
		2722 3	100 17	1986	3 ⁺			
4770		2818 2	100	1952	2 ⁺			
5061	(2 ⁺)	3109 2	100	1952	2 ⁺	M1(+E2)	+0.1 [#] 4	Mult.: $A_2=-0.45$ 1, $A_4=0.01$ 10.
5165		3179 4	100 18	1986	3 ⁺			
		4578 4	82 18	586	1 ⁺			

[†] From 1970OI03 and 1966Ma23. Intensity values averaged with those of 1967Wa13 by authors. γ -ray energies are calculated from level energy differences, recoil energy subtracted.

[‡] From 1966Ma23, except otherwise noted.

[#] From 1970OI03.

