Reaction : ^{21}Ne(p,γ)^{22}Na

The contributions of 46 resonances [AN70, BE77, KE77, GÖ82, GÖ83, BE92b] in the energy range from $E_r = 93.5$ to 1936.2 keV are taken into account. For the resonances between 943.7 and 1225.6 keV, the resonance strengths are the weigthed averages of those given by GÖ82, GÖ83 and BE92b, while for those between 1237 and 1936 keV, the strengths are the weigthed averages of those given by BE77 and KE77. The non-resonant contribution is calculated using the S-factors from RO75b for direct capture and from GÖ82 for the tails of the broad resonances. A major contribution at low temperatures comes from the resonance at $E_r = 93.5$ keV, for which only an upper limit of the strength is estimated [GÖ82, GÖ83]. Above $T_9 = 2$, HF estimates are used (see Sect. 2.5). The differences between the present rates and the CA88 ones in the temperature region around $T_9 = 0.03$ are due to the 93.5 keV resonance, for which the adopted strength [GÖ83] is two orders of magnitude smaller than the value used in CA88. Our thermalization effects reduce the ratio between 10 to 14% at $T_9 = 2.5$ to 10 (CA88 adopt $r_{tt} = 1$ at all temperatures).

E_r (keV)	J^π	$\omega\gamma$ (eV)					
		GÖ82	GÖ83	BE92b	adopt		
93.5 ± 6.7	$(0-1)^+$	$\leq 5 \times 10^{-6}$	$\leq 5 \times 10^{-8}$		$5^{+45}_{-5} \times 10^{-9}$		I
120.5 ± 0.6	$(1-3)^-$	$(3.75 \pm 0.75) \times 10^{-5}$			$(3.75 \pm 0.75) \times 10^{-5}$		I
216.6 ± 5.7		$\leq 5 \times 10^{-6}$			$5^{+45}_{-5} \times 10^{-7}$		M
258.3 ± 0.4	(4^+)			$(2.12 \pm 0.37) \times 10^{-3}$	$(2.12 \pm 0.37) \times 10^{-3}$		M
259.3 ± 0.4	3^+	$(8.25 \pm 1.25) \times 10^{-2}$			$(8.25 \pm 1.25) \times 10^{-2}$		I
277.6 ± 0.4	3	$(2.00 \pm 0.37) \times 10^{-3}$			$(2.00 \pm 0.37) \times 10^{-3}$		M
336.1 ± 0.4	$(1^-, 2)$	$(8.12 \pm 1.37) \times 10^{-3}$			$(8.12 \pm 1.37) \times 10^{-3}$		M
		AN70	BE77	KE77	GO83	adopt	
413.2 ± 3.8	$(3,4)^+$		$(1.9 \pm 0.4) \times 10^{-2}$			$(1.9 \pm 0.4) \times 10^{-2}$	M
481.3 ± 1.9	$(1^+, 2)$	0.13 ± 0.07	0.20 ± 0.04	0.14 ± 0.03		0.16 ± 0.02	M
500.7 ± 1.4	$(2^+ - 4^+)$	0.73 ± 0.30	0.76 ± 0.15	0.98 ± 0.19		0.83 ± 0.11	M
539.1 ± 2.9	$(1^-, 2^+)$		0.15 ± 0.04		0.13 ± 0.02	0.13 ± 0.02	M
540.1 ± 2.9	$(4^+ - 6^+)$		$(3.5 \pm 0.9) \times 10^{-2}$		0.03 ± 0.01	$(3.2 \pm 0.5) \times 10^{-2}$	M
621.2 ± 2.9	$(3^+, 4^-)$		$(5.2 \pm 1.2) \times 10^{-2}$		0.03 ± 0.01	$(3.5 \pm 0.5) \times 10^{-2}$	M
632.6 ± 1.9	2		$(5.2 \pm 1.2) \times 10^{-2}$		0.03 ± 0.01	$(3.5 \pm 0.5) \times 10^{-2}$	M
639.3 ± 1.0	$(2,3)^+$	0.08 ± 0.04	$(7.6 \pm 1.5) \times 10^{-2}$	$(6.0 \pm 1.2) \times 10^{-2}$	0.06 ± 0.01	$(6.5 \pm 0.7) \times 10^{-2}$	M
662.2 ± 1.9	$(1, 2^+)$		0.19 ± 0.04		0.14 ± 0.04	0.16 ± 0.03	M
669.7 ± 0.5	1^+	0.93 ± 0.37	1.50 ± 0.37	0.89 ± 0.18	0.85 ± 0.17	0.94 ± 0.11	M
684.2 ± 1.9	2				0.03 ± 0.01	$(2.6 \pm 0.6) \times 10^{-2}$	M
732.7 ± 0.5	2^+	3.95 ± 0.79	6.38 ± 1.88	3.82 ± 0.16	3.37 ± 0.87	3.95 ± 0.79	M
776.2 ± 1.0	3^+	0.36 ± 0.17	0.29 ± 0.06	0.37 ± 0.07		0.32 ± 0.05	M
808.0 ± 1.1	$0(1-3^+)$	0.54 ± 0.24	0.34 ± 0.06	0.52 ± 0.1		0.39 ± 0.05	M
834.6 ± 1.1	$(3^+ - 5^+)$	0.21 ± 0.1	0.17 ± 0.04	0.23 ± 0.04		0.19 ± 0.03	M
859.7 ± 2.9	2^-		0.16 ± 0.04			0.16 ± 0.04	M
865.9 ± 1.0	$(1,2)^+$	0.14 ± 0.07	0.10 ± 0.02	$(9.5 \pm 1.9) \times 10^{-2}$		0.10 ± 0.02	M
896.9 ± 1.0	$(2^+, 3)$		0.11 ± 0.02			0.11 ± 0.02	M
943.7 ± 1.0	$(2^+, 4^+)$		$(3.0 \pm 0.6) \times 10^{-2}$			$(3.0 \pm 0.6) \times 10^{-2}$	M
Res. 1039 – 1936 keV		see comments					

T_9	low	adopt	high	exp	ratio	T_9	low	adopt	high	exp	ratio	T_9	low	adopt	high	exp	ratio
0.015	2.50	4.03	5.41	-25	0.9	0.14	4.19	5.49	7.01	-3	0.9	1.25	2.68	3.18	3.69	3	0.9
0.016	1.30	2.08	2.82	-24	0.9	0.15	7.58	9.88	12.5	-3	0.9	1.5	4.53	5.39	6.26	3	0.8
0.018	2.37	3.81	5.30	-23	0.9	0.16	1.30	1.68	2.11	-2	1.0	1.75	6.67	7.95	9.25	3	0.8
0.02	2.90	4.66	10.0	-22	0.8	0.18	3.45	4.39	5.44	-2	1.0	2	0.89	1.07	1.24	4	0.8
0.025	0.44	1.00	66.5	-19	0.03	0.20	0.87	1.09	1.32	-1	1.0	2.5	1.27	1.56	1.83	4	0.7
0.03	0.63	4.06	409	-17	0.01	0.25	7.01	8.46	10.0	-1	1.1	3	1.61	2.01	2.40	4	0.7
0.04	3.39	6.70	124	-13	0.04	0.30	3.46	4.13	4.84	0	1.1	3.5	1.90	2.43	2.93	4	0.7
0.05	2.73	4.17	18.3	-10	0.1	0.35	1.11	1.32	1.54	1	1.1	4	2.16	2.81	3.43	4	0.7
0.06	2.24	3.21	7.04	-8	0.3	0.40	2.65	3.14	3.66	1	1.1	5	2.58	3.50	4.36	4	0.7
0.07	5.05	7.03	11.7	-7	0.5	0.45	5.19	6.14	7.14	1	1.1	6	2.92	4.10	5.22	4	0.8
0.08	5.09	6.96	10.2	-6	0.6	0.50	0.87	1.05	1.22	2	1.1	7	3.21	4.67	6.04	4	0.8
0.09	3.00	4.06	5.64	-5	0.7	0.60	1.99	2.35	2.73	2	1.1	8	3.46	5.20	6.85	4	0.9
0.10	1.22	1.64	2.20	-4	0.8	0.70	3.66	4.32	5.01	2	1.1	9	3.68	5.72	7.64	4	1.0
0.11	3.80	5.06	6.67	-4	0.9	0.80	5.99	7.08	8.21	2	1.0	10	3.88	6.22	8.44	4	1.0
0.12	0.97	1.28	1.67	-3	0.9	0.90	0.91	1.08	1.25	3	1.0						
0.13	2.13	2.81	3.61	-3	0.9	1.00	1.31	1.54	1.79	3	0.9						