Reaction : ^{27}Al(p,γ)^{28}Si

The contribution of 122 resonances between 195 and 3817.4 keV is taken into account. For resonances above 956 keV, the adopted strengths are the averages of those given by SM58, AN63, NO63, AN64, NO64, SI65, EN66, GI68, KU69, ME70, TV72, DA73, ME75, and BR95. Several of the reported values are renormalized. For the resonances at $E < 195$ keV, the data of CH86c, CH88, TI88 and CH97 ($< 2.4 \times 10^{-14}$ eV for the 72 keV resonance and $< 1.0 \times 10^{-14}$ eV for the 84 keV resonance from CH97, respectively) are used to set upper limits on the resonance strengths. The direct capture contribution is adopted from the calculations of TI88, which are in agreement with available experimental data [LY69, HA88]. The contributions of resonance tails are found to be negligible with respect to the direct capture one. The available data allow the reaction rate calculation for $T_9 \leq 6$. Above $T_9 = 6$, HF estimates are used as explained in Sect. 2.5. Below $T_9 = 0.05$, the differences with the CA88 rates are due to the availability of more recent upper limits on resonance strengths, as well as the inclusion of a direct capture contribution neglected by CA88.

E_r (keV)	J^π	adopted $\omega\gamma$ (eV)	Ref.	
71.9 ± 0.5	2^+	$(0.15^{+1.35}_{-0.15}) \times 10^{-15}$	CH86c, CH88, CH97	I
84.8 ± 0.4	1^-	$(0.15^{+1.35}_{-0.15}) \times 10^{-15}$	CH86c, CH88, CH97	M
195.5 ± 0.9	2^+	$(1.40 \pm 0.7) \times 10^{-5}$	SM62	M
214.7 ± 0.4		$(9.00 \pm 0.2) \times 10^{-5}$	BR47, EN60, OK60a	M
282.1 ± 0.4	4^+	$(3.80 \pm 0.7) \times 10^{-4}$	BR47, EN60, OK60a	M
314.8 ± 0.4		0.0015 ± 0.0003	BR47, EN60, OK60a, SM62, LY69, ME75	M
390.9 ± 0.3		0.009 ± 0.001	SM62	M
430.6 ± 0.5		0.0014 ± 0.0002	BR47, LY69, ME75	M
486.72 ± 0.07	2^+	0.061 ± 0.007	BR47, EN60, OK60a, SM62 LY69, ME75, SW75	M
488.15 ± 0.07	2	0.042 ± 0.009	EN60, OK60a, ME75	M
589.40 ± 0.04		0.004 ± 0.001	BR47, EN60, OK60a, LY69, ME75	M
609.47 ± 0.04	3^-	0.266 ± 0.014	BR47, SM58, EN60, OK60a, SM62, NO63, NO64, EN66, LY69, LE71, DA73, AL74, ME75, SW75, PA79, BR95	M
631.08 ± 0.04	2^-	0.120 ± 0.009	BR47, EN60, OK60a, LY69, SW75	M
654.85 ± 0.04	3^+	0.045 ± 0.005	BR47, EN60, OK60a, LY69, ME75	M
705.06 ± 0.04	2^-	0.12 ± 0.01	BR47, EN60, OK60a, LY69, ME75	M
709.97 ± 0.04		0.160 ± 0.016	BR47, EN60, OK60a, LY69, ME75	M
716.21 ± 0.04		0.021 ± 0.003	BR47, SM62, EN60, OK60a, LY69, ME75	M
733.02 ± 0.04	2^-	0.135 ± 0.016	BR47, EN60, OK60a, LY69, ME75	M
739.56 ± 0.04	4^+	0.16 ± 0.02	BR47, EN60, OK60a, LY69, ME75	M
745.79 ± 0.04		0.41 ± 0.03	BR47, SM58, EN60, OK60a, NO63, NO64, EN66, LY69, LE71, DA73, AL74, ME75, BR95	M
855.82 ± 0.05	2^-	0.015 ± 0.002	BR47, LY69, ME75	M
889.73 ± 0.05	2^+	0.140 ± 0.018	LY69, ME75	M
903.50 ± 0.05	3^-	0.176 ± 0.021	SM58, NO63, NO64, EN66, LY69, LE71, DA73, ME75	M
956.20 ± 0.03	3^+	1.90 ± 0.10	SM58, NO63, NO64, EN66, LE71, PA70, DA73	M
Res. 1130 – 3817 keV		see comments		

T_9	low	adopt	high	exp	ratio	T_9	low	adopt	high	exp	ratio	T_9	low	adopt	high	exp	ratio
0.025	0.03	1.67	16.4	-23	0.7	0.16	4.40	6.52	8.65	-5	1.1	1.25	4.66	5.20	5.75	2	0.7
0.03	0.03	3.39	33.5	-21	0.6	0.18	2.06	2.99	3.92	-4	1.2	1.5	0.99	1.10	1.21	3	0.8
0.04	0.03	2.44	24.1	-18	0.5	0.2	0.71	1.01	1.32	-3	1.2	1.75	1.71	1.91	2.10	3	0.8
0.05	0.05	1.25	11.9	-16	0.5	0.25	6.93	9.55	12.2	-2	1.4	2	2.63	2.93	3.23	3	0.8
0.06	3.72	8.37	25.1	-15	0.9	0.3	3.49	4.64	5.79	-2	1.5	2.5	4.86	5.45	6.04	3	0.8
0.07	0.73	1.31	1.96	-12	1.1	0.35	1.23	1.58	1.94	-1	1.5	3	7.39	8.35	9.31	3	0.7
0.08	3.89	6.73	9.59	-11	1.1	0.4	3.49	4.38	5.27	-1	1.3	3.5	1.00	1.14	1.28	4	0.7
0.09	0.87	1.45	2.04	-9	1.1	0.45	0.86	1.05	1.25	0	1.1	4	1.25	1.44	1.62	4	0.7
0.1	1.04	1.69	2.35	-8	1.1	0.5	1.88	2.27	2.66	0	1.0	5	1.71	1.99	2.27	4	0.6
0.11	0.79	1.26	1.73	-7	1.1	0.6	6.97	8.20	9.43	0	0.8	6	2.08	2.45	2.82	4	0.6
0.12	4.29	6.71	9.13	-7	1.1	0.7	1.97	2.28	2.59	1	0.8	7	2.47	4.03	5.59	4	0.7
0.13	1.79	2.75	3.72	-6	1.1	0.8	4.56	5.21	5.87	1	0.7	8	2.82	5.88	8.94	4	0.8
0.14	6.07	9.21	12.3	-6	1.1	0.9	0.90	1.03	1.15	2	0.7	9	3.13	7.96	12.8	4	0.9
0.15	1.75	2.62	3.49	-5	1.1	1	1.60	1.80	2.00	2	0.7	10	0.34	1.02	1.71	5	1.0