

$^{30}\text{Si}(\text{p},\alpha)$:resonances **1982Ch09**

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh		NDS 184, 29 (2022)	24-Jun-2022

1982Ch09: E=4.9-6.08 MeV protons from the INER 7 MV Van de Graaff. Enriched SiO_2 targets (98.5% ^{30}Si). Alpha particles detected using silicon $\Delta\text{E-E}$ telescope in a scattering chamber. Beam energy uncertainty (FWHM) of 1.7 keV. Measured $\alpha(\theta)$ for α to g.s. from 8 resonances; deduced orbital momentum mixing ratios.

 ^{31}P Levels

E(level) [†]	$J\pi^{\ddagger}$	Γ	$S_{\alpha\gamma}[\text{eV}]^{\#}$	Comments
12043 2		<5 keV	25	E(p)(lab)=4906 2.
12053 2		4 keV 2	8.8	E(p)(lab)=4916 2.
12071 2		3 keV 2	8.1	E(p)(lab)=4935 2.
12078 2		<4 keV	6.1	E(p)(lab)=4942 2.
12091 2		<3 keV	32	E(p)(lab)=4956 2.
12132 2		<20 keV	8.6	E(p)(lab)=4998 2.
12159 2		<4 keV	21	Additional information 1. E(p)(lab)=5026 2.
12176 2		<4 keV	12	E(p)(lab)=5043 2.
12180 2		<10 keV	<5.1	Additional information 2. E(p)(lab)=5048 2.
12200 2		<3 keV	5.7	E(p)(lab)=5068 2.
12207 2		<5 keV	3.9	E(p)(lab)=5076 2.
12219 2		4 keV 2	82	E(p)(lab)=5088 2.
12235 2		<4 keV	24	E(p)(lab)=5104 2.
12238 2		<10 keV	21	E(p)(lab)=5108 2.
12256 2		8 keV 4	19	E(p)(lab)=5126 2.
12264 2		<5 keV	<17	E(p)(lab)=5134 2.
12274 2		<10 keV	<17	E(p)(lab)=5145 2.
12283 2		<10 keV	<10	E(p)(lab)=5154 2.
12291 2		<6 keV	17	E(p)(lab)=5162 2.
12302 2		<8 keV	18	E(p)(lab)=5174 2.
12308 2		<5 keV	27	E(p)(lab)=5180 2.
12331 2	$5/2^{(-)}$	6 keV 3	120	E(p)(lab)=5204 2. $A_2=-1.01$ 3, $A_4=+0.08$ 2. $\Gamma_{\alpha 0} \geq 20$ eV.
12385 2		<3 keV	251	E(p)(lab)=5260 2.
12393 2		<3 keV	100	E(p)(lab)=5268 2.
12418 2		<5 keV	53	E(p)(lab)=5294 2.
12428 2		<5 keV	66	E(p)(lab)=5304 2.
12434 2		<4 keV	17	E(p)(lab)=5310 2.
12447 2	$7/2^{(-)}$	<3 keV	66	E(p)(lab)=5324 2. $A_2=+0.48$ 3, $A_4=-0.25$ 4, $A_6=+0.67$ 2. $\Gamma_{\alpha 0} \geq 8.3$ eV.
12458 2		<10 keV	<9.7	E(p)(lab)=5335 2.
12482 2		<8 keV	32	E(p)(lab)=5360 2.
12495 2		12 keV 2	228	E(p)(lab)=5373 2.
12509 2		<12 keV	<16	E(p)(lab)=5388 2.
12529 2		<8 keV	4.5	E(p)(lab)=5408 2.
12563 2		<8 keV	15	E(p)(lab)=5444 2.
12577 2		<8 keV	19	E(p)(lab)=5458 2.
12589 2		<6 keV	18	E(p)(lab)=5470 2.
12629 2	$(3/2, 5/2^-, 7/2)$	<6 keV	61	E(p)(lab)=5512 2. $A_2=+0.65$ 2, $A_4=+0.01$ 3, $A_6=+0.53$ 2. $\Gamma_{\alpha 0} \geq 7.6$ eV.
12643 2	$5/2^{(-)}$	4 keV 2	207	E(p)(lab)=5526 2.

Continued on next page (footnotes at end of table)

$^{30}\text{Si}(\text{p},\alpha)$:resonances **1982Ch09** (continued) ^{31}P Levels (continued)

E(level) [†]	J ^π [‡]	Γ	S _{αγ} [eV] [#]	Comments
				A ₂ =-0.96 2, A ₄ =+0.04 1. Γ _{α0} ≥35 eV.
12660 2		<14 keV	63	E(p)(lab)=5544 2.
12683 2		10 keV 3	75	E(p)(lab)=5568 2.
12743 2		8 keV 2	58	E(p)(lab)=5630 2.
12757 2		<6 keV	8.0	E(p)(lab)=5644 2.
12765 2		<8 keV	8.5	E(p)(lab)=5652 2.
12786 2		<10 keV	46	E(p)(lab)=5674 2.
12794 2		<6 keV	26	E(p)(lab)=5682 2.
12806 2	(3/2 ⁺ ,7/2 ⁻)	6 keV 3	424	E(p)(lab)=5695 2. A ₂ =+0.69 1, A ₄ =-0.04 2, A ₆ =+0.001 1. Γ _{α0} ≥53 eV.
12830 2	3/2	<3 keV	140	E(p)(lab)=5720 2. A ₂ =+0.39 3. Γ _{α0} ≥35 eV.
12858 2		12 keV 5	73	E(p)(lab)=5748 2.
12881 2		17 keV 5	184	E(p)(lab)=5772 2.
12887 2		5 keV 3	121	E(p)(lab)=5778 2.
12914 2		<8 keV	16	E(p)(lab)=5806 2.
12937 2		<6 keV	24	E(p)(lab)=5830 2.
12948 2		4 keV 2	148	E(p)(lab)=5841 2.
12964 2		<8 keV	<216	E(p)(lab)=5858 2.
12979 2		<6 keV	<90	E(p)(lab)=5874 2.
12989 2		<10 keV	<192	E(p)(lab)=5884 2.
12995 2		<6 keV	<164	E(p)(lab)=5890 2.
13012 2		<8 keV	<52	E(p)(lab)=5908 2.
13036 2		<8 keV	<31	E(p)(lab)=5932 2.
13060 2		<4 keV	456	E(p)(lab)=5957 2.
13067 2		8 keV 2	947	E(p)(lab)=5964 2.
13076 2		<5 keV	12	E(p)(lab)=5974 2.
13099 2	(5/2 ⁻ ,7/2 ⁻)	5 keV 2	65	E(p)(lab)=5998 2. A ₂ =+0.01 3, A ₄ =-0.55 1. Γ _{α0} ≥8.1 eV.
13107 2	(3/2 ⁺ ,7/2 ⁻)	<6 keV	35	E(p)(lab)=6006 2. A ₂ =+0.65 10. Γ _{α0} ≥4.4 eV.
13121 2		6 keV 3	61	E(p)(lab)=6020 2.
13146 2		8 keV 4	20	E(p)(lab)=6046 2.
13159 2		<10 keV	28	E(p)(lab)=6060 2.
13171 2		<3 keV	33	E(p)(lab)=6072 2.

[†] Determined from E(p)(cm)+S(p), where S(p)=7296.553 22 (2021Wa16) and E(p)(cm) deduced from listed E(p)(lab) values.

Uncertainty of 2 keV in E(p)(lab) has been assigned by the evaluators based on FWHM and energy step size of 2-4 keV selected by 1982Ch09.

[‡] From measured $\alpha(\theta)$.

[#] Resonance strength=(2J+1)Γ_αΓ_γ/Γ (eV).