

NIST Atomic Spectra Database Levels Data

Some data for neutral and singly-charged ions are available in the [Handbook of Basic Atomic Spectroscopic Data](#)

He Spectrum

$$\vec{S} = \vec{S}_1 + \vec{S}_2$$

$$\vec{L} = \vec{L}_1 + \vec{L}_2$$

$$\vec{J} = \vec{L} + \vec{S}$$

Configuration	Term	J	Level (eV)	
1s ²	1S	0	0.0	$S = 0, L = 0, J = 0$

1s2s	3S	1	19.8196134	$S = 1, L = 0, J = 1$
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S=1 lower energy
(space anti-symm)

1s2s	1S	0	20.6157736	
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1s2p	3P ^o	2	20.9640857	} $S = 1, L = 1, J = 0, 1, 2$
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		1	20.9640951
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		0	20.9642176
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1s2p	1P ^o	1	21.2180214	
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P^o odd parity

$\Psi(-r) = -\Psi(r)$

1s3s	3S	1	22.7184651	
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PERIODIC TABLE

Atomic Properties of the Elements

NIST

National Institute of Standards and Technology
Technology Administration, U.S. Department of Commerce

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VIII A

Physics
Laboratory
physics.nist.gov

Standard Reference
Data Group
www.nist.gov/srd

Frequently used fundamental physical constants

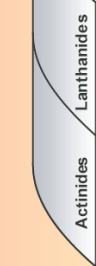
For the most accurate values of these and other constants, visit physics.nist.gov/constants

1 second = 9 192 631 770 periods of radiation corresponding to the transition between the two hyperfine levels of the ground state of ¹³³Cs

speed of light in vacuum	<i>c</i>	299 792 458 m s ⁻¹	(exact)
Planck constant	<i>h</i>	6.6261 × 10 ⁻³⁴ J s	($\hbar = h/2\pi$)
elementary charge	<i>e</i>	1.6022 × 10 ⁻¹⁹ C	
electron mass	<i>m_e</i>	9.1094 × 10 ⁻³¹ kg	
	<i>m_ec²</i>	0.5110 MeV	
proton mass	<i>m_p</i>	1.6726 × 10 ⁻²⁷ kg	
fine-structure constant	<i>α</i>	1/137.036	
Rydberg constant	<i>R_∞</i>	10 973 732 m ⁻¹	
	<i>R_∞c</i>	3.289 842 × 10 ¹⁵ Hz	
	<i>R_∞hc</i>	13.6057 eV	
Boltzmann constant	<i>k</i>	1.3807 × 10 ⁻²³ J K ⁻¹	

- Solids
- Liquids
- Gases
- Artificially Prepared

Period	1	1 IA	2 IIA											13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIII A									
	2	3	4											5	6	7	8	9	10									
	3	11	12	3	4	5	6	7	8		9	10	11	12														
	4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36									
	5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54									
	6	55	56	Lanthanides Actinides										72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	7	87	88											104	105	106	107	108	109	110	111	112	114	116				



Atomic Number Ground-state Level

Symbol **Ce** ¹G₄

Name Cerium

Atomic Weight 140.116

Ground-state Configuration [Xe]4f5d6s²

Ionization Energy (eV) 5.5387

57 La Lanthanum 138.9055 [Xe]5d6s ² 5.5769	58 Ce Cerium 140.116 [Xe]4f5d6s ² 5.5387	59 Pr Praseodymium 140.90765 [Xe]4f3 5.473	60 Nd Neodymium 144.24 [Xe]4f6s ² 5.5250	61 Pm Promethium (145) [Xe]4f6s ² 5.582	62 Sm Samarium 150.36 [Xe]4f6s ² 5.6437	63 Eu Europium 151.964 [Xe]4f6s ² 5.6704	64 Gd Gadolinium 157.25 [Xe]4f7d6s ² 5.6498	65 Tb Terbium 158.92534 [Xe]4f9s ² 5.8638	66 Dy Dysprosium 162.500 [Xe]4f10s ² 5.9389	67 Ho Holmium 164.93032 [Xe]4f11s ² 6.0215	68 Er Erbium 167.259 [Xe]4f12s ² 6.1077	69 Tm Thulium 168.93421 [Xe]4f13s ² 6.1843	70 Yb Ytterbium 173.04 [Xe]4f14s ² 6.2549	71 Lu Lutetium 174.967 [Xe]4f14d6s ² 5.4259
89 Ac Actinium (227) [Rn]6d7s ² 5.17	90 Th Thorium 232.0381 [Rn]6d2f7s ² 6.3067	91 Pa Protactinium 231.03588 [Rn]5f6d7s ² 5.89	92 U Uranium 238.02891 [Rn]5f6d7s ² 6.1941	93 Np Neptunium (237) [Rn]5f6d7s ² 6.2657	94 Pu Plutonium (244) [Rn]5f7s ² 6.0260	95 Am Americium (243) [Rn]5f7s ² 5.9738	96 Cm Curium (247) [Rn]5f6d7s ² 5.9914	97 Bk Berkelium (247) [Rn]5f7s ² 6.1979	98 Cf Californium (251) [Rn]5f10s ² 6.2817	99 Es Einsteinium (252) [Rn]5f11s ² 6.42	100 Fm Fermium (257) [Rn]5f12s ² 6.50	101 Md Mendelevium (258) [Rn]5f13s ² 6.58	102 No Nobelium (259) [Rn]5f14s ² 6.65	103 Lr Lawrencium (262) [Rn]5f14d7s ² 4.9 ?

[†]Based upon ¹²C. () indicates the mass number of the most stable isotope.

For a description of the data, visit physics.nist.gov/data