

Hydrogen Atom

$$Z = 1$$

$$\text{Atomic Mass : } M_A = 1.00794$$

$$\sigma_a(\text{Mb}) = 109.76097 \frac{df}{dE} (\text{eV}^{-1})$$

$$\mu_m = \sigma_a \cdot N_A \cdot M_A^{-1}$$

Table I. Discrete oscillator strength, f_n .

Energy (eV)	f_n	λ (Å)	Energy (eV)	f_n	λ (Å)
1.0199E+01	4.1600E-01	1.2157E+03	1.3551E+01	3.2100E-04	9.1492E+02
1.2088E+01	7.9100E-02	1.0257E+03	1.3556E+01	2.7000E-04	9.1458E+02
1.2749E+01	2.9000E-02	9.7254E+02	1.3561E+01	2.3000E-04	9.1429E+02
1.3054E+01	1.3900E-02	9.4974E+02	1.3564E+01	1.9700E-04	9.1404E+02
1.3221E+01	7.8000E-03	9.3780E+02	1.3568E+01	1.7000E-04	9.1383E+02
1.3321E+01	4.8200E-03	9.3075E+02	1.3570E+01	1.4800E-04	9.1364E+02
1.3386E+01	3.1800E-03	9.7254E+02	1.3573E+01	1.2900E-04	9.1348E+02
1.3431E+01	2.2200E-03	9.2315E+02	1.3575E+01	1.1400E-04	9.1334E+02
1.3462E+01	1.6100E-03	9.2096E+02	1.3577E+01	1.0000E-04	9.1322E+02
1.3486E+01	1.2000E-03	9.1935E+02	1.3578E+01	8.9300E-05	9.1310E+02
1.3504E+01	9.2100E-04	9.1813E+02	1.3580E+01	7.9700E-05	9.1301E+02
1.3518E+01	7.2300E-04	9.1718E+02	1.3581E+01	7.1500E-05	9.1292E+02
1.3529E+01	5.7800E-04	9.1643E+02	1.3582E+01	6.4300E-05	9.1284E+02
1.3538E+01	4.6900E-04	9.1582E+02	1.3583E+01	5.8100E-05	9.1277E+02
1.3545E+01	3.8600E-04	9.1533E+02			

The oscillator-strength density (in Rydberg unit) in the continuum is given by

$$df/dE = \frac{2^7}{3(1+k^2)^4} \exp\left(-\frac{4}{k} \tan^{-1} k\right) \left[1 - \exp\left(-\frac{2\pi}{k}\right)\right]^{-1},$$

where $\epsilon = k^2$ is the electron kinetic energy, and incident photon energy $E = 1 + \epsilon$. Here energies are given in Rydberg unit.

Table II. Oscillator-strength density, df/dE , photoabsorption cross section, σ_a , and mass absorption coefficient, μ_m .

Energy (eV)	f_n (eV ⁻¹)	σ_a (Mb)	μ_m (cm ² g ⁻¹)	λ (Å)
1.3606E+01	5.7437E-02	6.3043E+00	3.7666E+06	9.1127E+02
1.5000E+01	4.4223E-02	4.8540E+00	2.9001E+06	8.2656E+02
1.7500E+01	2.9105E-02	3.1946E+00	1.9087E+06	7.0848E+02
2.0000E+01	2.0153E-02	2.2120E+00	1.3216E+06	6.1992E+02
2.2500E+01	1.4516E-02	1.5933E+00	9.5195E+05	5.5104E+02
2.5000E+01	1.0792E-02	1.1845E+00	7.0773E+05	4.9594E+02
2.7500E+01	8.2344E-03	9.0382E-01	5.4001E+05	4.5085E+02
3.0000E+01	6.4209E-03	7.0476E-01	4.2107E+05	4.1328E+02
3.5000E+01	4.1153E-03	4.5170E-01	2.6988E+05	3.5424E+02
4.0000E+01	2.7880E-03	3.0601E-01	1.8283E+05	3.0996E+02
4.5000E+01	1.9716E-03	2.1641E-01	1.2930E+05	2.7552E+02
5.0000E+01	1.4429E-03	1.5838E-01	9.4627E+04	2.4797E+02
6.0000E+01	8.3665E-04	9.1831E-02	5.4866E+04	2.0664E+02
7.0000E+01	5.2532E-04	5.7660E-02	3.4450E+04	1.7712E+02
8.0000E+01	3.4990E-04	3.8405E-02	2.2946E+04	1.5498E+02
9.0000E+01	2.4391E-04	2.6772E-02	1.5995E+04	1.3776E+02
1.0000E+02	1.7630E-04	1.9351E-02	1.1562E+04	1.2398E+02
1.2500E+02	8.8166E-05	9.6772E-03	5.7818E+03	9.9187E+01
1.5000E+02	4.9787E-05	5.4646E-03	3.2650E+03	8.2656E+01
1.7500E+02	3.0602E-05	3.3589E-03	2.0069E+03	7.0848E+01
2.0000E+02	2.0026E-05	2.1980E-03	1.3133E+03	6.1992E+01
2.2500E+02	1.3751E-05	1.5094E-03	9.0180E+02	5.5104E+01
2.5000E+02	9.8109E-06	1.0769E-03	6.4339E+02	4.9594E+01
2.7500E+02	7.2208E-06	7.9256E-04	4.7353E+02	4.5085E+01
3.0000E+02	5.4533E-06	5.9856E-04	3.5762E+02	4.1328E+01
3.5000E+02	3.3097E-06	3.6328E-04	2.1705E+02	3.5424E+01
4.0000E+02	2.1432E-06	2.3524E-04	1.4055E+02	3.0996E+01
4.5000E+02	1.4586E-06	1.6010E-04	9.5656E+01	2.7552E+01
5.0000E+02	1.0327E-06	1.1335E-04	6.7724E+01	2.4797E+01
6.0000E+02	5.6679E-07	6.2212E-05	3.7170E+01	2.0664E+01
7.0000E+02	3.4053E-07	3.7377E-05	2.2332E+01	1.7712E+01
8.0000E+02	2.1868E-07	2.4002E-05	1.4341E+01	1.5498E+01
9.0000E+02	1.4779E-07	1.6221E-05	9.6917E+00	1.3776E+01
1.0000E+03	1.0400E-07	1.1415E-05	6.8203E+00	1.2398E+01
1.2500E+03	4.9288E-08	5.4099E-06	3.2322E+00	9.9187E+00

Table II. Oscillator-strength density, df/dE , photoabsorption cross section, σ_a , and mass absorption coefficient, μ_m . (Continued)

Energy (eV)	f_n (eV ⁻¹)	σ_a (Mb)	μ_m (cm ² g ⁻¹)	λ (Å)
1.5000E+03	2.6712E-08	2.9320E-06	1.7518E+00	8.2656E+00
1.7500E+03	1.5889E-08	1.7440E-06	1.0420E+00	7.0848E+00
2.0000E+03	1.0120E-08	1.1108E-06	6.6368E-01	6.1992E+00
2.2500E+03	6.7927E-09	7.4558E-07	4.4546E-01	5.5104E+00
2.5000E+03	4.7522E-09	5.2161E-07	3.1164E-01	4.9594E+00
2.7500E+03	3.4383E-09	3.7739E-07	2.2548E-01	4.5085E+00
3.0000E+03	2.5578E-09	2.8074E-07	1.6774E-01	4.1328E+00
3.5000E+03	1.5131E-09	1.6608E-07	9.9230E-02	3.5424E+00
4.0000E+03	9.5949E-10	1.0531E-07	6.2922E-02	3.0996E+00
4.5000E+03	6.4161E-10	7.0424E-08	4.2076E-02	2.7552E+00
5.0000E+03	4.4745E-10	4.9112E-08	2.9343E-02	2.4797E+00
6.0000E+03	2.3959E-10	2.6297E-08	1.5712E-02	2.0664E+00
7.0000E+03	1.4116E-10	1.5494E-08	9.2574E-03	1.7712E+00
8.0000E+03	8.9218E-11	9.7927E-09	5.8508E-03	1.5498E+00
9.0000E+03	5.9497E-11	6.5304E-09	3.9017E-03	1.3776E+00
1.0000E+04	4.1395E-11	4.5435E-09	2.7146E-03	1.2398E+00
1.2500E+04	1.9181E-11	2.1053E-09	1.2579E-03	9.9187E-01
1.5000E+04	1.0221E-11	1.1219E-09	6.7031E-04	8.2656E-01
1.7500E+04	5.9999E-12	6.5856E-10	3.9347E-04	7.0848E-01
2.0000E+04	3.7806E-12	4.1496E-10	2.4792E-04	6.1992E-01
2.2500E+04	2.5148E-12	2.7602E-10	1.6492E-04	5.5104E-01
2.5000E+04	1.7459E-12	1.9163E-10	1.1449E-04	4.9594E-01
2.7500E+04	1.2548E-12	1.3773E-10	8.2291E-05	4.5085E-01
3.0000E+04	9.2809E-13	1.0187E-10	6.0863E-05	4.1328E-01
3.5000E+04	5.4373E-13	5.9680E-11	3.5657E-05	3.5424E-01
4.0000E+04	3.4206E-13	3.7545E-11	2.2432E-05	3.0996E-01
4.5000E+04	2.2724E-13	2.4942E-11	1.4902E-05	2.7552E-01
5.0000E+04	1.5759E-13	1.7297E-11	1.0334E-05	2.4797E-01
6.0000E+04	8.3621E-14	9.1783E-12	5.4838E-06	2.0664E-01
7.0000E+04	4.8922E-14	5.3697E-12	3.2082E-06	1.7712E-01
8.0000E+04	3.0742E-14	3.3743E-12	2.0161E-06	1.5498E-01
9.0000E+04	2.0404E-14	2.2395E-12	1.3380E-06	1.3776E-01
1.0000E+05	1.4139E-14	1.5519E-12	9.2719E-07	1.2398E-01

