Photoelectric effect

Energy of the incident photon
=
Minimum energy required to emit electrons
+
Kinetic energy of emitted electrons

$$E = W_0 + E_{KIN}$$

$$h\,f = h\,f_0 + E_{KIN}$$

$$\frac{h\,c}{\lambda} = \frac{h\,c}{\lambda_0} + E_{KIN}$$

$$E = h\,f = \frac{h\,c}{\lambda}$$

$$W_0 = h\,f_0 = \frac{h\,c}{\lambda_0} \qquad E_{KIN} = \frac{1}{2} m_e\,v^2$$

De Broglie wavelength (matter wave)

$$\lambda_D = \frac{h}{m\,v}$$

Hydrogen spectral series
Rydberg formula

$$\frac{1}{\lambda} = R_H\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$$

$$E = R_H\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$$

$n_1 < n_2$
n_1=1, Lyman series
n_1=2, Balmer series
n_1=3, Paschen series
n_1=4, Brackett series
n_1=5, Pfund series
n_1=6, Humphreys series

Other formulae

$$c = \lambda\,f$$

1 eV = 1.602 176 634 ×10^{-19} J
1 nm = 10^{-9} m
1 Å = 10^{-10} m

Symbol	Magnitude		S.I. unit
E	Energy of the incident photon		J
W_0	Work function		J
E_{KIN}	Kinetic energy		J
f	Frequency		Hz = s^{-1}
f_0	Threshold frequency		Hz = s^{-1}
λ	Wavelength		m
λ_0	Threshold wavelength		m
λ_D	De Broglie wavelength		m
m	Mass		kg
v	Speed		m/s
c	Speed of light in vacuum:	299 792 458	m/s
h	Planck constant:	6.626 070 15 × 10^{-34}	J·s
m_e	Electron mass:	9.109 383 7015 × 10^{-31}	kg
R_H	Rydberg constant:	1.096 775 8341 × 10^{7}	m^{-1}
		2.178 685 812 × 10^{-18}	J
n	Principal quantum number of the energy level		–