UNIVERSIDAD AUTÓNOMA DE NUEVO LEÓN
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FORMULARIO DE FÍSICA IV

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CONSTANTES

$C = 3 \times 10^8\, m/s$ $\quad m_e = 9.1 \times 10^{-31} kg$

$1A^0 = 1 \times 10^{-10} m$ $\quad r_0 = 1.3 \times 10^{-15} m$

$R = 1.097 \times 10^7 m^{-1}$ $\quad h = 6.625 \times 10^{-34}\, J \cdot s$

$q_e = 1.6 \times 10^{-19} Coulomb$ $\quad \frac{h}{m_0 C} = 0.024 A^0$

$\varepsilon_0 = 8.85 \times 10^{-12}\, C^2/Nm^2$

$1UMA = 931.48\, Mev, 1eV = 1.6 \times 10^{-19} Joules$

Sustancia	**Índice de refracción** (línea sodio D)
Azúcar	1.56
Diámetro	2.417
Mica	1.56 – 1.60
Benceno	1.504
Glicerina	1.47
Agua	1.333
Alcohol etílico	1.362
Aceite de oliva	1.46

$$V_1 = V_2 + V$$

$$V_1 = \frac{V_2 + V}{1 + \frac{V_2 V}{C^2}} \qquad V_2 = \frac{V_1 - V}{1 - \frac{V_1 V}{C^2}}$$

$$V_1 = \sqrt{V_{1x}^2 + V_{1y}^2} \qquad V_2 = \sqrt{V_{2x}^2 + V_{2y}^2}$$

$$V_{1x} = \frac{V_{2x} + V}{1 + \frac{V_{2x} V}{C^2}} \qquad V_{2x} = \frac{V_{1x} - V}{1 - \frac{V_{1x} V}{C^2}}$$

$$V_{1y} = \frac{V_{2y}\sqrt{1 - \frac{V^2}{C^2}}}{1 + \frac{V_{2x} V}{C^2}} \qquad V_{2y} = \frac{V_{1y}\sqrt{1 - \frac{V^2}{C^2}}}{1 - \frac{V_{1x} V}{C^2}}$$

$$\tan\theta_1 = \frac{V_{1y}}{V_{1x}} \qquad \tan\theta_2 = \frac{V_{2y}}{V_{2x}}$$

$$f = 2RC\frac{1}{n^3} \qquad \frac{1}{\lambda} = R\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$$

Serie	n_f	n_i	**Formula**	**Zona (Region spectral)**
Lyman	1	2; 3; 4...	$\frac{1}{\lambda} = R\left(\frac{1}{1^2} - \frac{1}{n_i^2}\right)$	Ultravioleta
Belmer	2	3; 4; 5...	$\frac{1}{\lambda} = R\left(\frac{1}{2^2} - \frac{1}{n_i^2}\right)$	Ultravioleta Y 4 lineas en la visible
Peschen	3	4; 5; 6...	$\frac{1}{\lambda} = R\left(\frac{1}{3^2} - \frac{1}{n_i^2}\right)$	Infrarrojo
Brackett	4	5; 6; 7...	$\frac{1}{\lambda} = R\left(\frac{1}{4} - \frac{1}{n_i^2}\right)$	infrarrojo
Pfund	5	6; 7; 8...	$\frac{1}{\lambda} = R\left(\frac{1}{5^2} - \frac{1}{n_i^2}\right)$	Infrarrojo

$$E = h\gamma = \frac{hc}{\lambda} = E_{n_i} - E_{n_f} = RZ^2 hc\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$$

$$E_i = \frac{13.6 eV Z^2}{n^2} \qquad \frac{1}{\lambda} = RZ^2\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$$

$$K = h\gamma - h\gamma_o \qquad K = eV_o \qquad K = \frac{1}{2}mV^2$$

$$\gamma = \frac{c}{\lambda} \qquad \gamma_o = \frac{c}{\lambda_o} \qquad \varphi = h\gamma_o$$

La energía del fotón es igual a:	El trabajo de extracción **(función trabajo)** mas	La energía cinética máxima del fotoelectrón
$\boldsymbol{E}$	φ	K_{max}
$\boldsymbol{h\gamma}$	$h\gamma_o$	$^1/_2\, mV^2$
$\boldsymbol{\frac{hc}{\lambda}}$	$\frac{hc}{\lambda_o}$	$\frac{p^2}{2m}$
		eV_o

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$$L_1 = L_2\sqrt{1 - \frac{V^2}{C^2}} \qquad T_1 = \frac{T_2}{\sqrt{1 - \frac{V^2}{C^2}}}$$

$$m_1 = \frac{m_2}{\sqrt{1 - \frac{V^2}{C^2}}} \qquad n = \frac{C}{V}$$

$$\sin\theta_c = \frac{n_2}{n_1} \qquad \sin\theta_c = \frac{v_1}{v_2}$$

$$n = \frac{\lambda_o}{\lambda_n} \qquad \frac{\sin\theta_i}{\sin\theta_r} = \frac{n_2}{n_1}$$

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$$R = r_0 A^{1/3}$$

$$Be = Zm_H + Nm_N - M_\alpha$$

Nombre	Símbolo	Abreviación
Protón	^1_1H	ρ, p
Deuterón	^2_1H	δ, d
Tritio	^3_1H	τ, t
Partícula Alfa	^4_2He	α
Neutrón	$^1_0\eta$	η, n

$$Q = (mx + MX) - (my + MY)$$

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$$E_0 = \frac{hc}{\lambda_0} \qquad E_f = \frac{hc}{\lambda_f} \qquad P_0 = \frac{h}{\lambda_0}$$

$$P_f = \frac{h}{\lambda_f} \qquad P_e = mV \qquad K = \frac{1}{2}mV^2$$

$$K = (P_0 - P_f)C \qquad K = E_0 - E_f \qquad V = 2\pi rf$$

$$\frac{h}{m_0 C}(1 - \cos\theta) = \lambda_f - \lambda_0$$

$$r = 0.53A^0 n^2 \qquad K = \frac{e^2}{8\pi\varepsilon_o r} \qquad F = \frac{e^2}{4\pi\varepsilon_o r^2}$$

$$\tan\varphi = \frac{\lambda_0 \sin\theta}{\lambda_f - \lambda_0\cos\theta} \qquad E_n = -\frac{13.6eVZ^2}{n^2}$$

$$E_{TOT} = -\frac{e^2}{8\pi\varepsilon_o r} \qquad E_{TOT} = K + U \qquad U = -\frac{e^2}{4\pi\varepsilon_o r}$$

$$E_e = \frac{13.6eVZ^2}{n^2} \qquad E_E = 13.6eVZ^2\left(1 - \frac{1}{n^2}\right)$$