

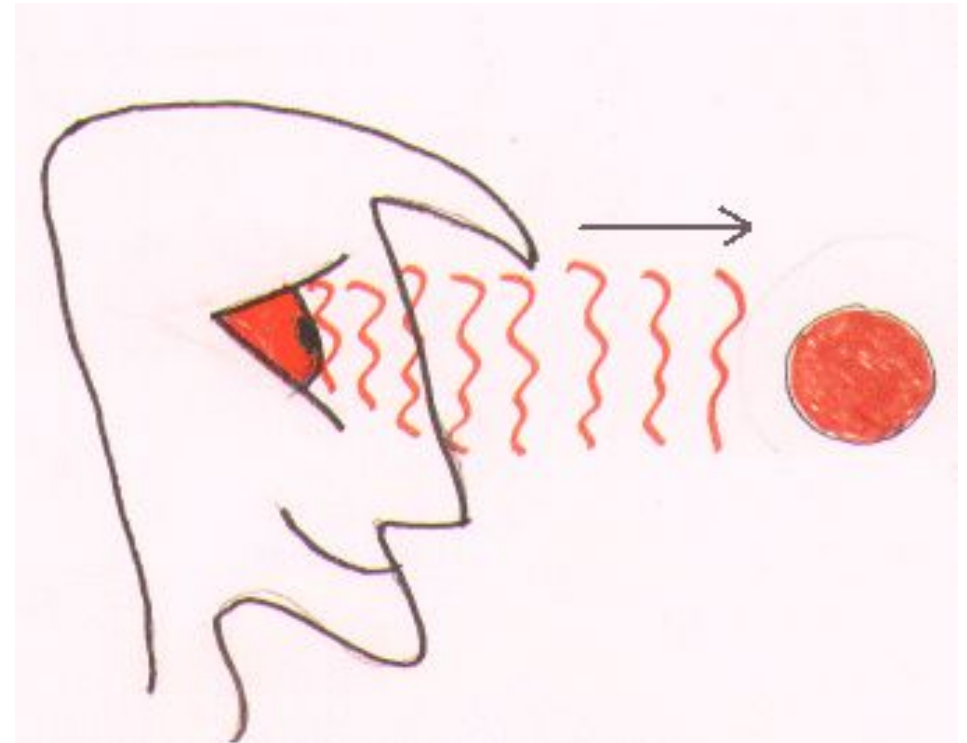
El mensajero cósmico



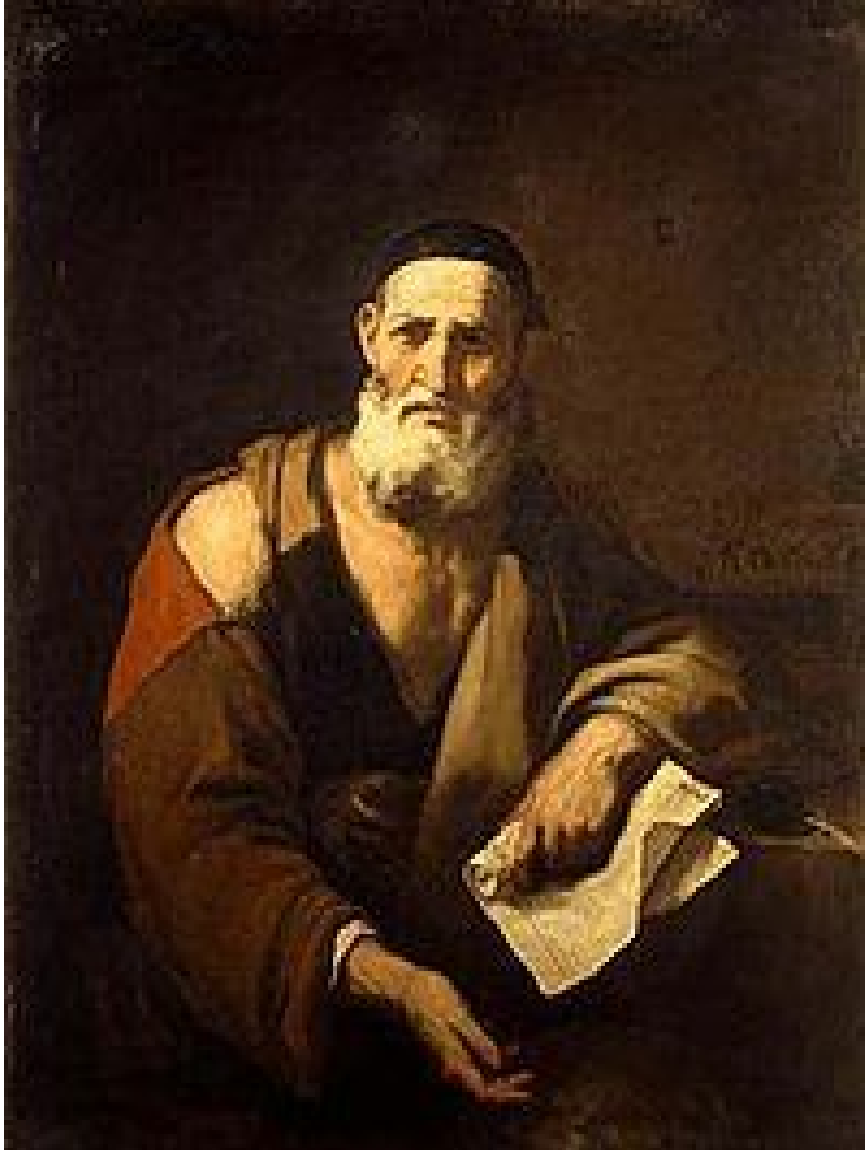
¿Y cómo podemos ver?

- Empédocles ~490 – 430 a.c

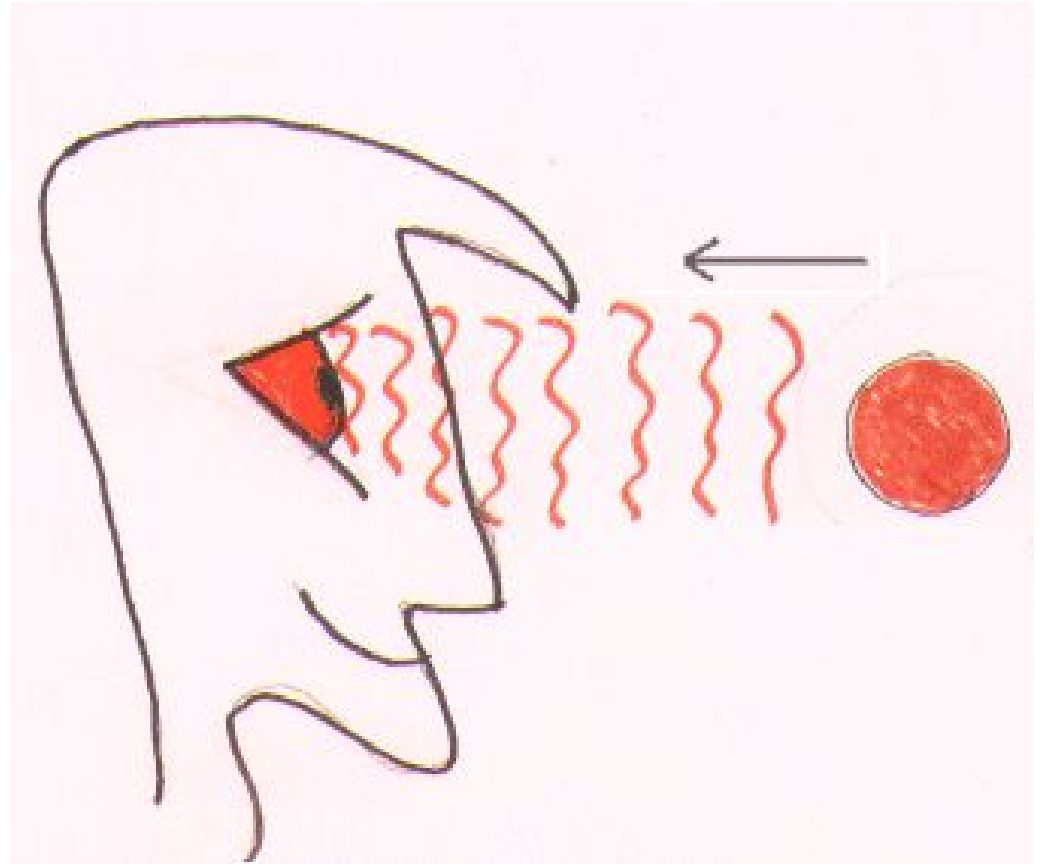
Extromisión



- Leucipo de Mileto S. V a.c

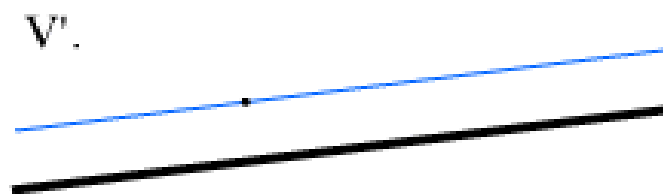
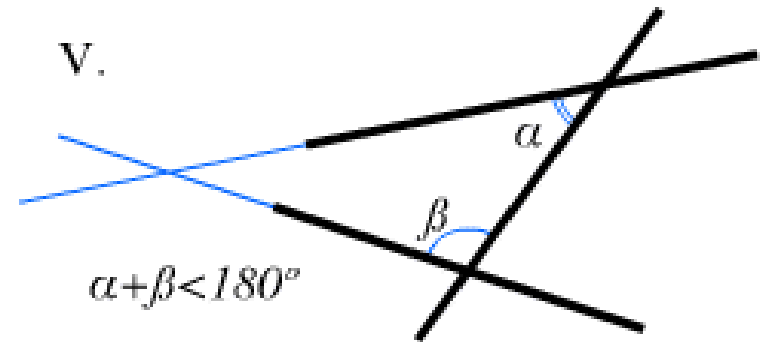
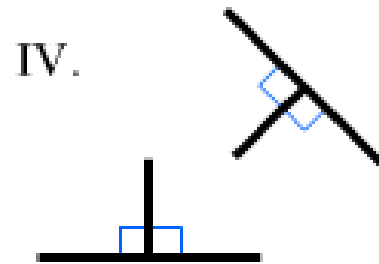
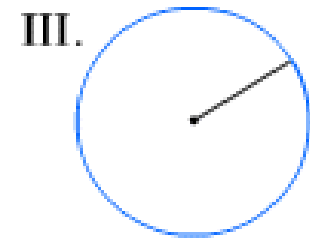
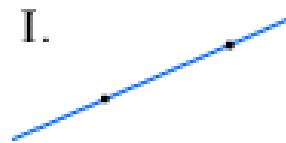
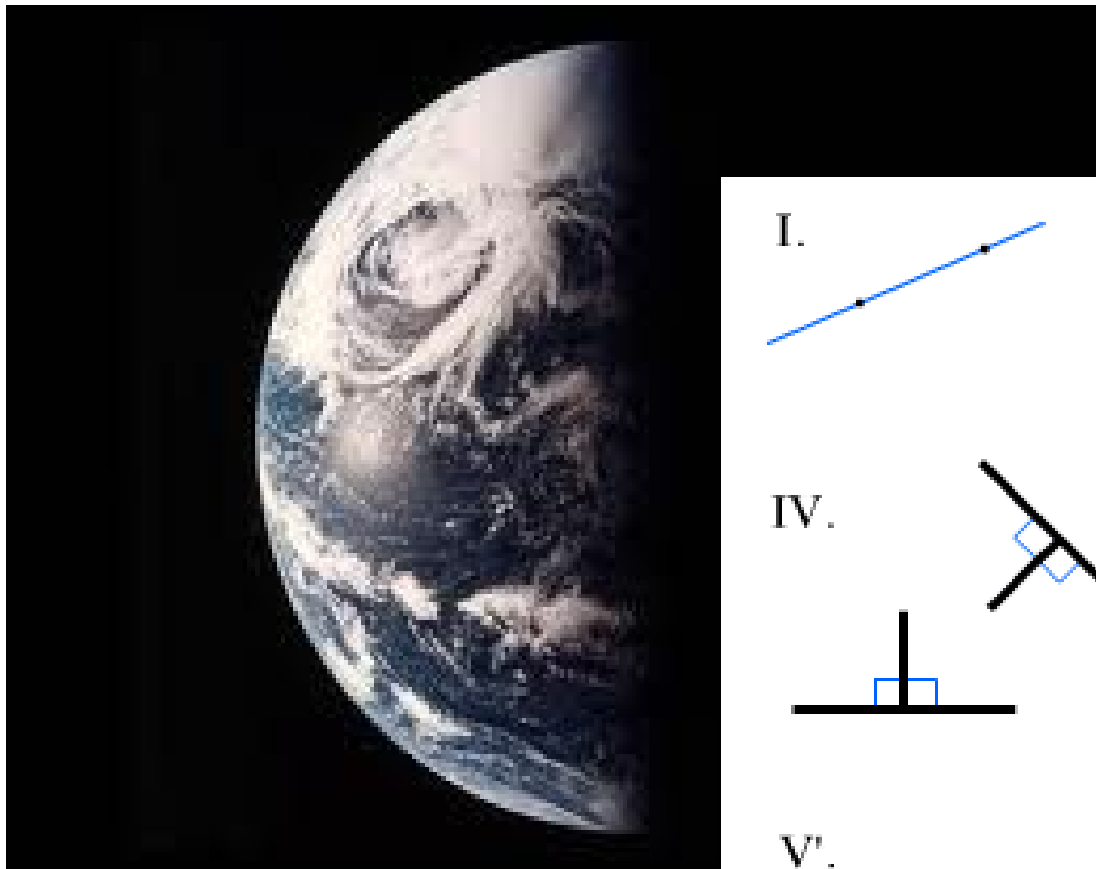


Intromisión



La luz se desplaza en línea recta

- Cumple con los 5 axiomas de la geometría Ecuclidiana



Alhazen (Abū 'Alī al-Ḥaṣan ibn al-Ḥaṣan ibn al-Hayṭam)

(965–1040)



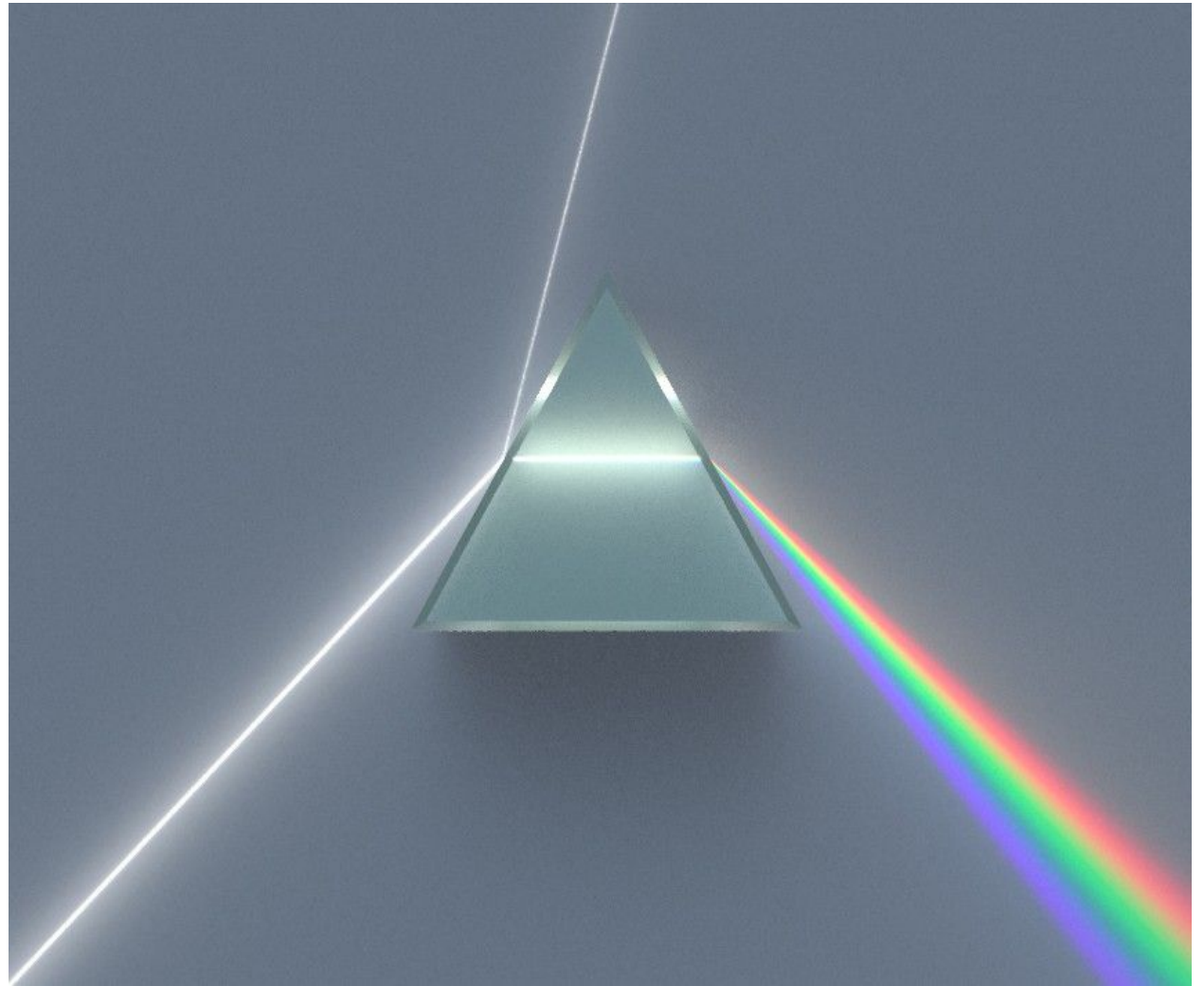
Objetos como receptores de luz



Teoría corpuscular de la luz ~1675

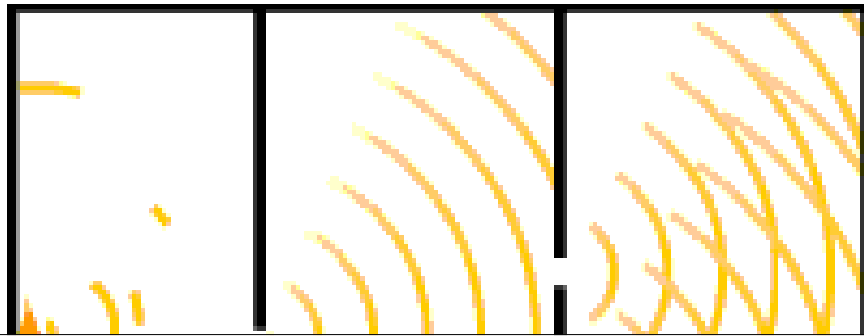


- Propagación
- Reflexión
- Refracción

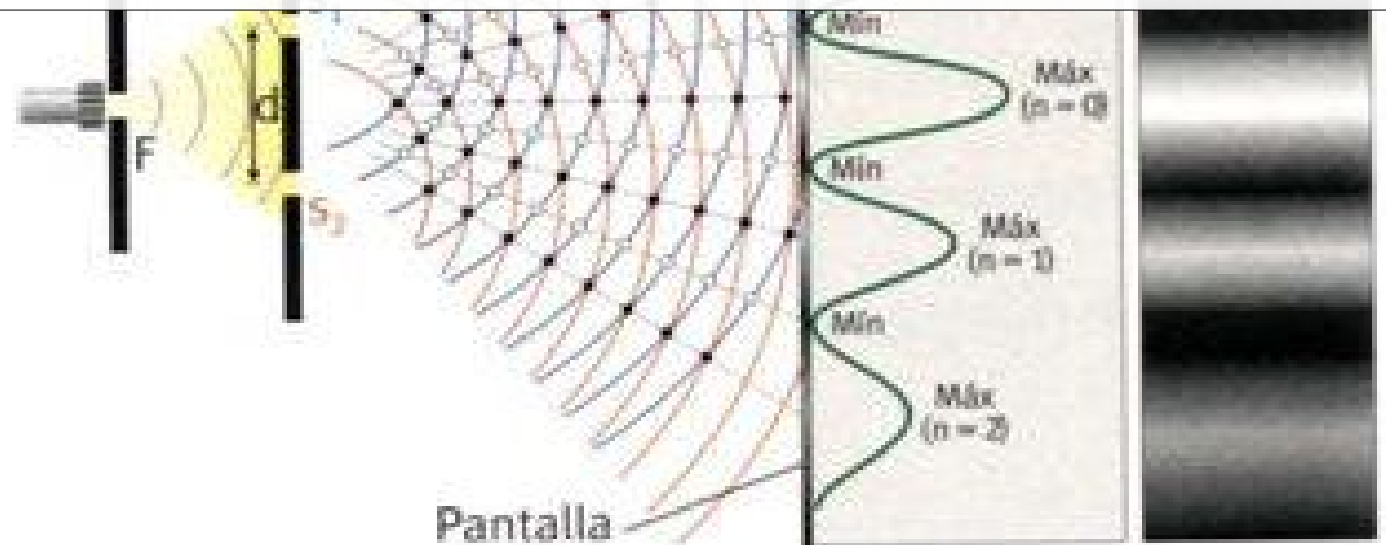


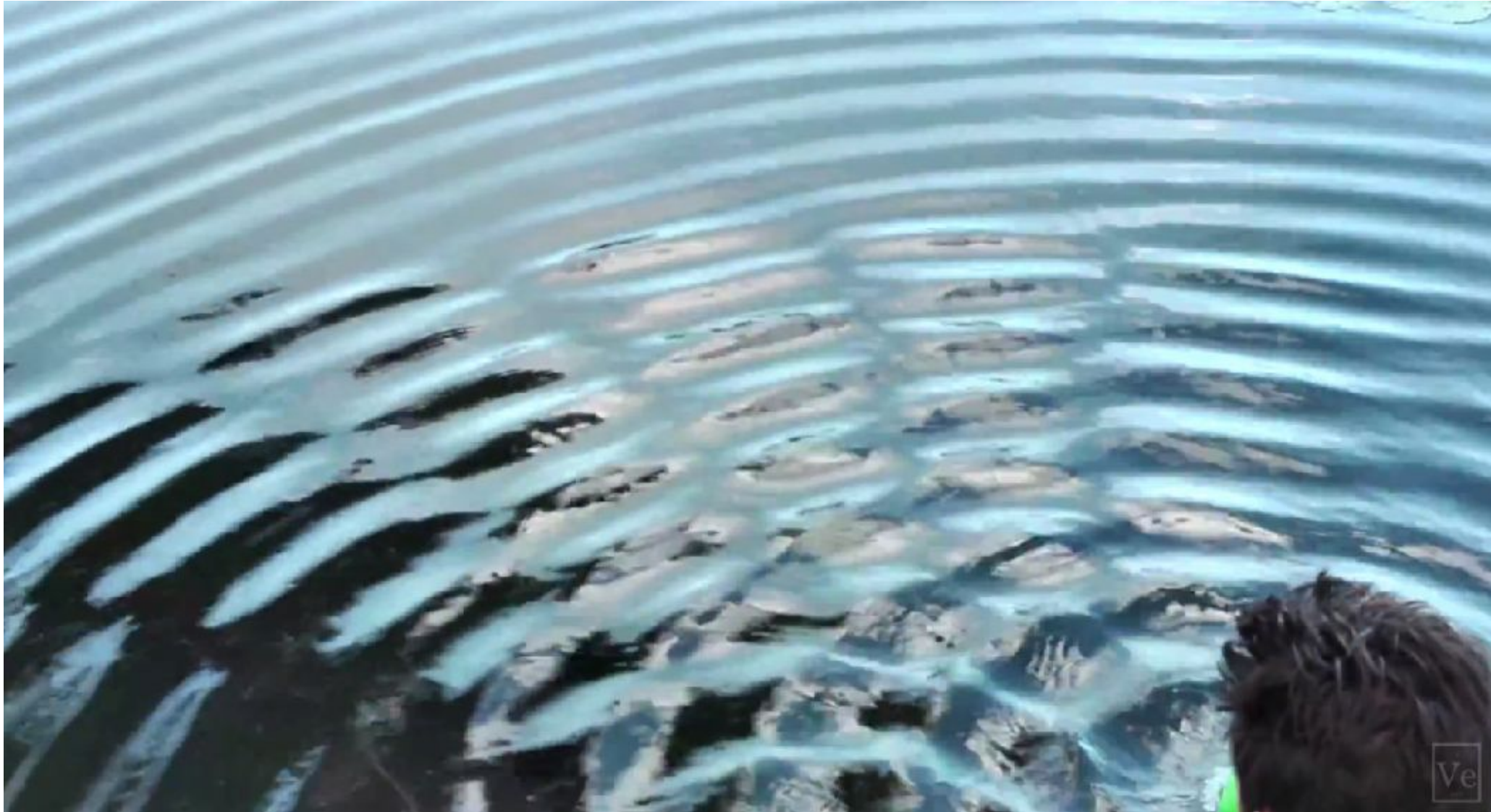
- Difracción?

Experimento Young ~1801



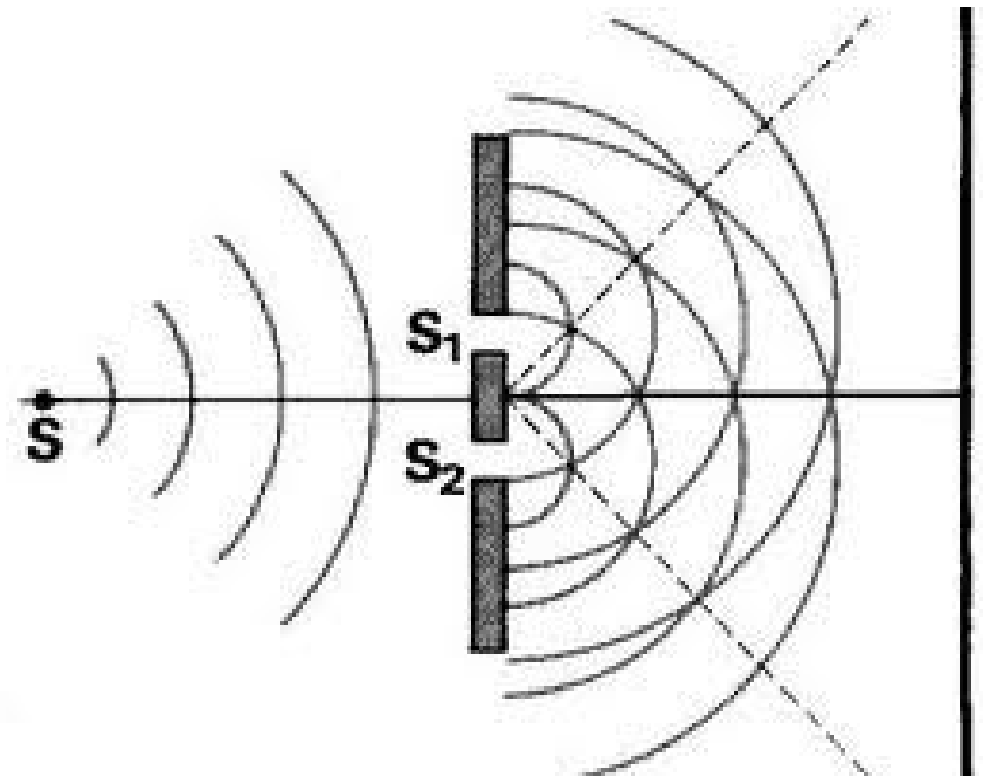
¿Cómo puedo obtener multiples regiones oscuras a partir de un solo flujo de partículas?





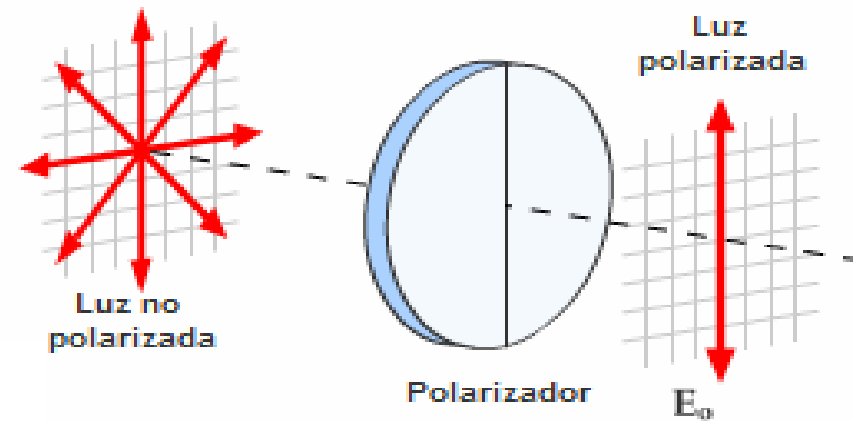
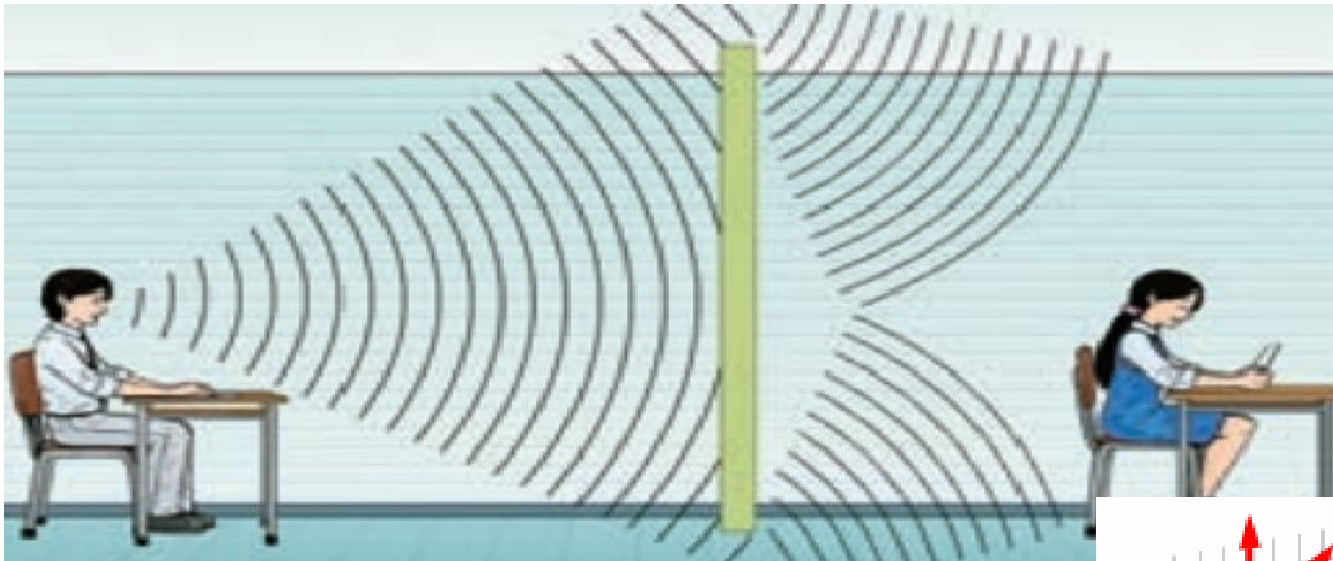
<http://www.youtube.com/watch?v=luv6hY6zsd0>

Teoría ondulatoria de Huygens (1678)

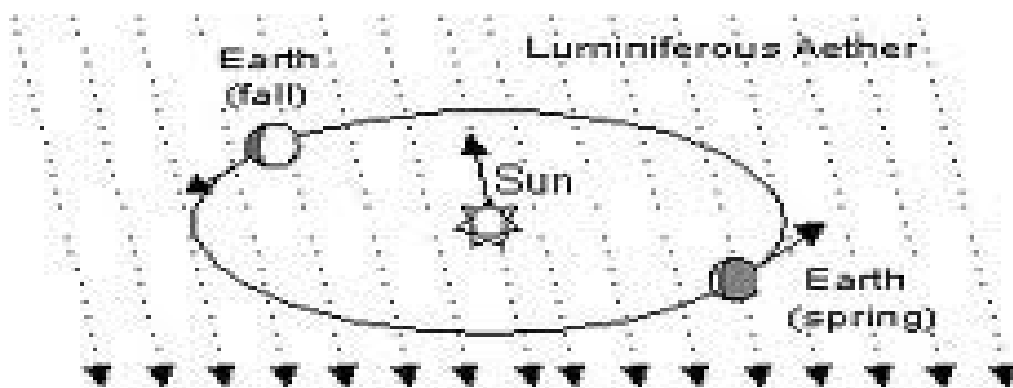




Si la luz es una onda, entonces...

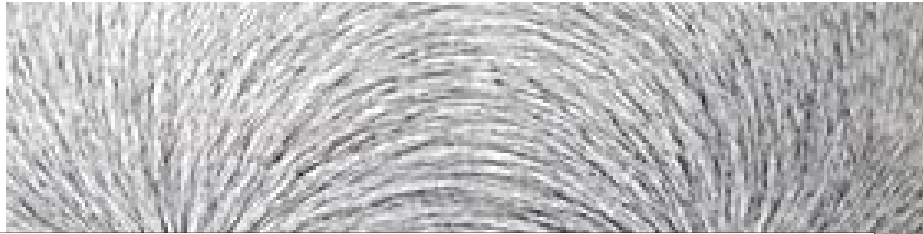


<http://www.youtube.com/watch?v=8LHRAuGoPyE>



James Clerk Maxwell 1861

Campos Eléctricos y Magnéticos...???



$$\left(\nabla^2 - \mu\epsilon \frac{\partial^2}{\partial t^2} \right) \mathbf{E} = 0$$
$$\left(\nabla^2 - \mu\epsilon \frac{\partial^2}{\partial t^2} \right) \mathbf{B} = 0$$

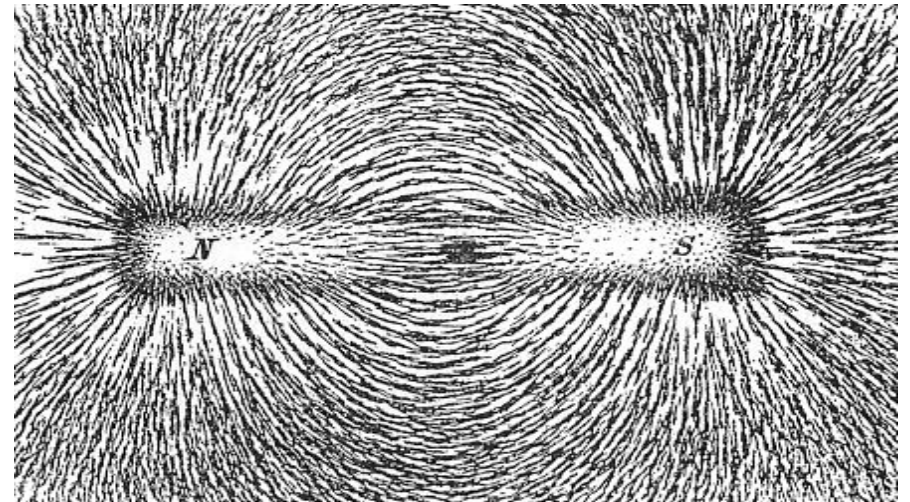
$$v = \frac{1}{\sqrt{\epsilon_0 \mu_0}}$$

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$

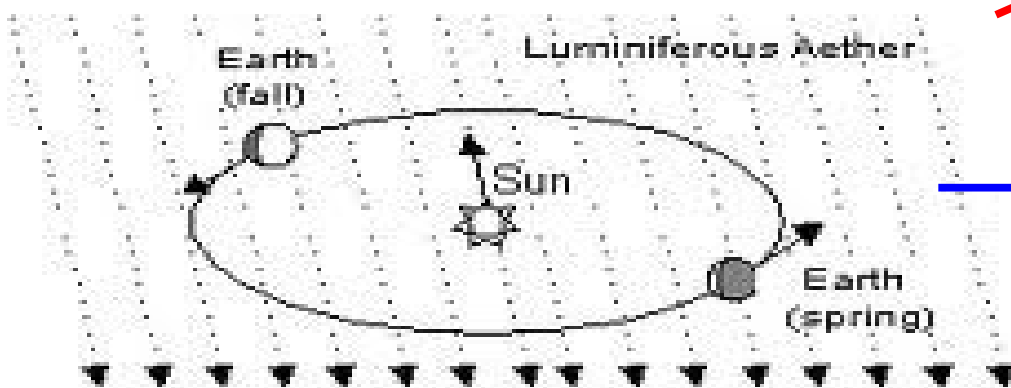
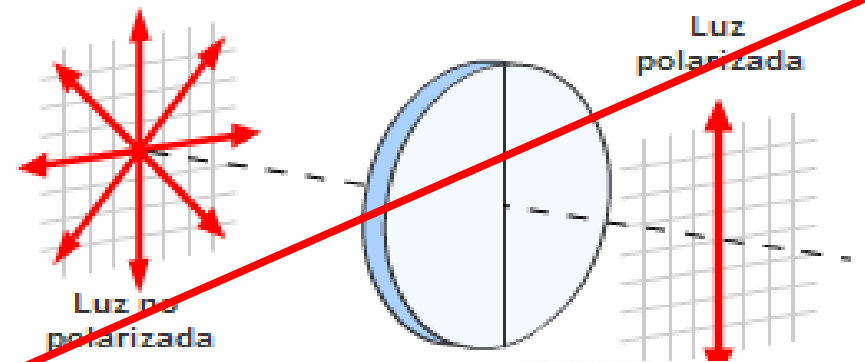
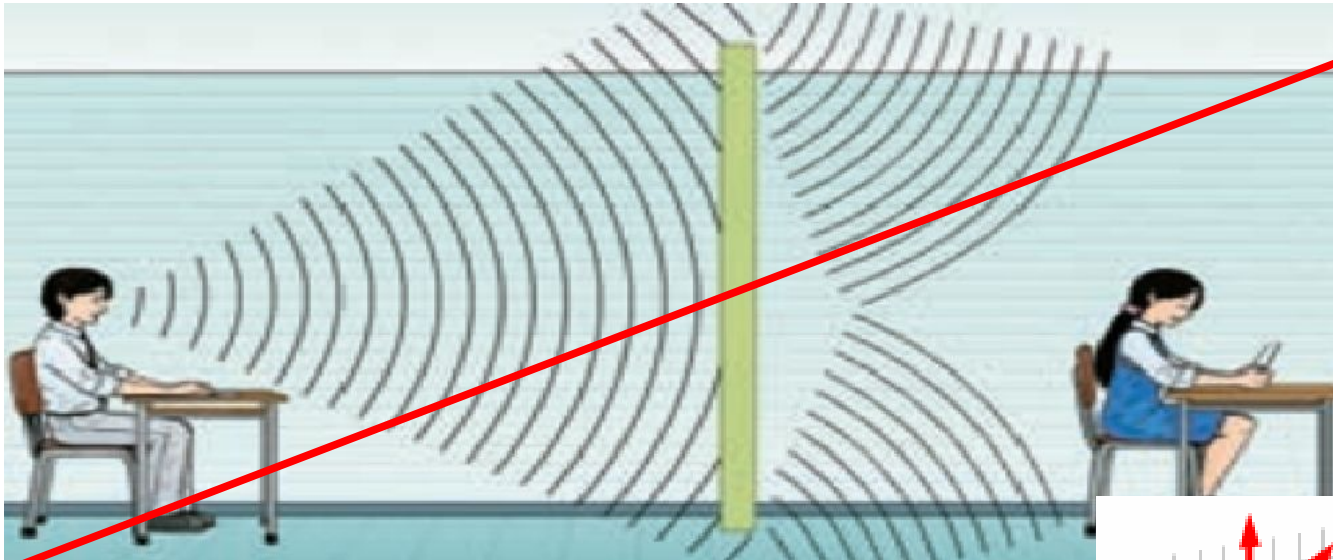
$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

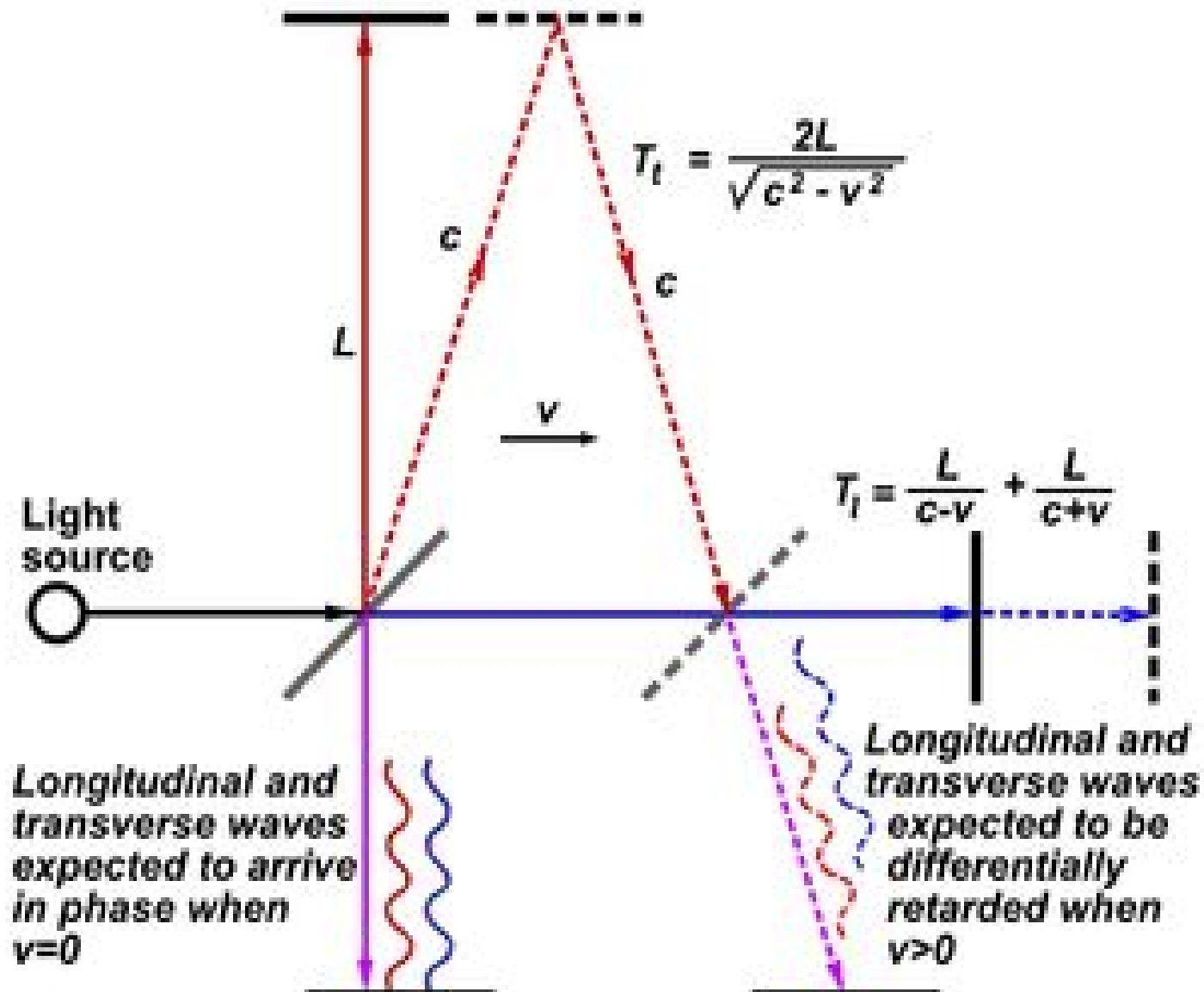
$$\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \mu_0 \epsilon_0 \frac{\partial \mathbf{E}}{\partial t}$$



Si la luz es una onda, entonces...



Michelson y Morley



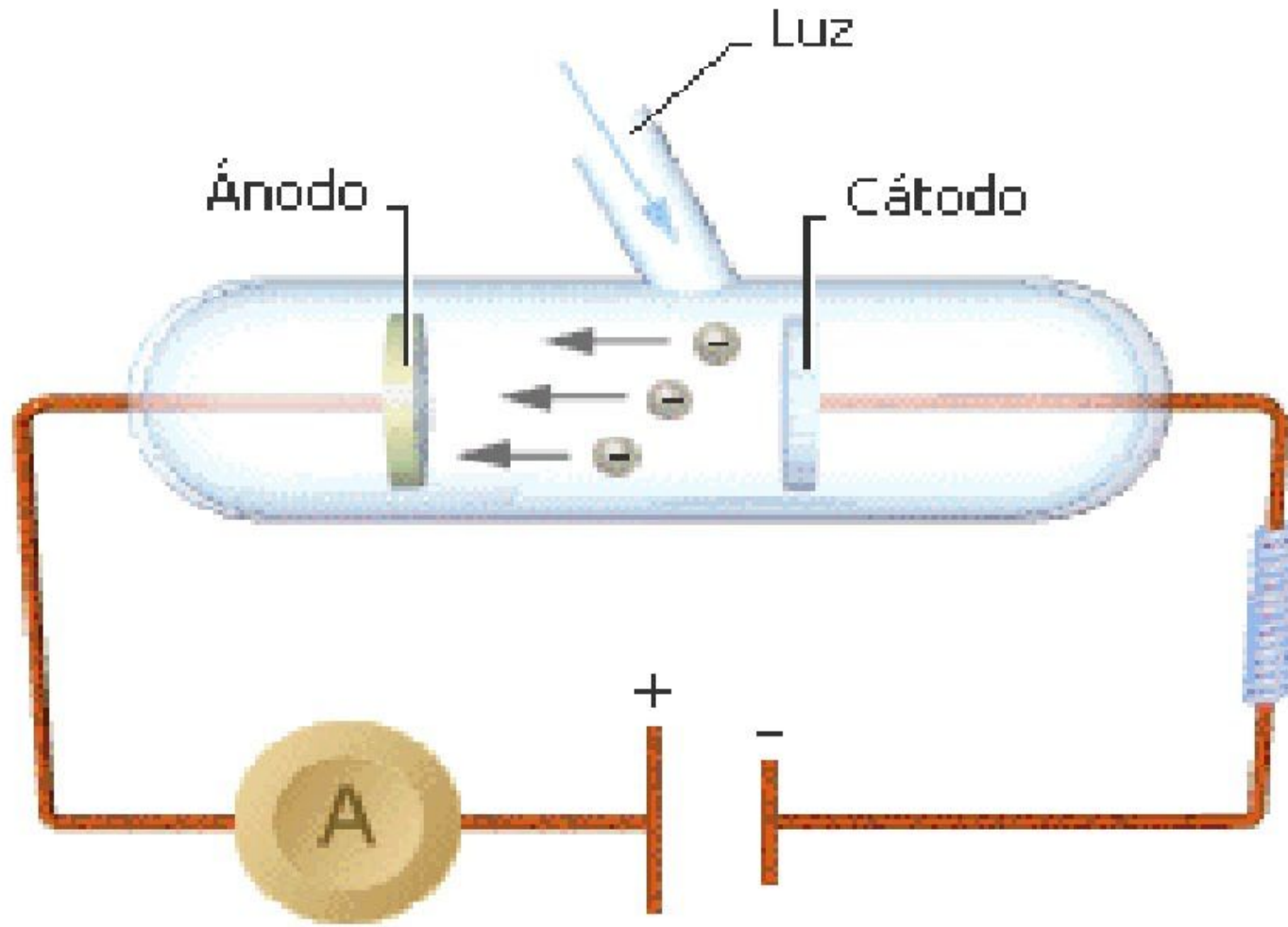
Que tenemos...

- La luz es una onda (Difracción)
- Viaja en el vacío, luego es una onda electromagnética (Michelson-Morley)
- Viaja a velocidad constante (Ec. de Maxwell)
- Es polarizada (diversos experimentos)

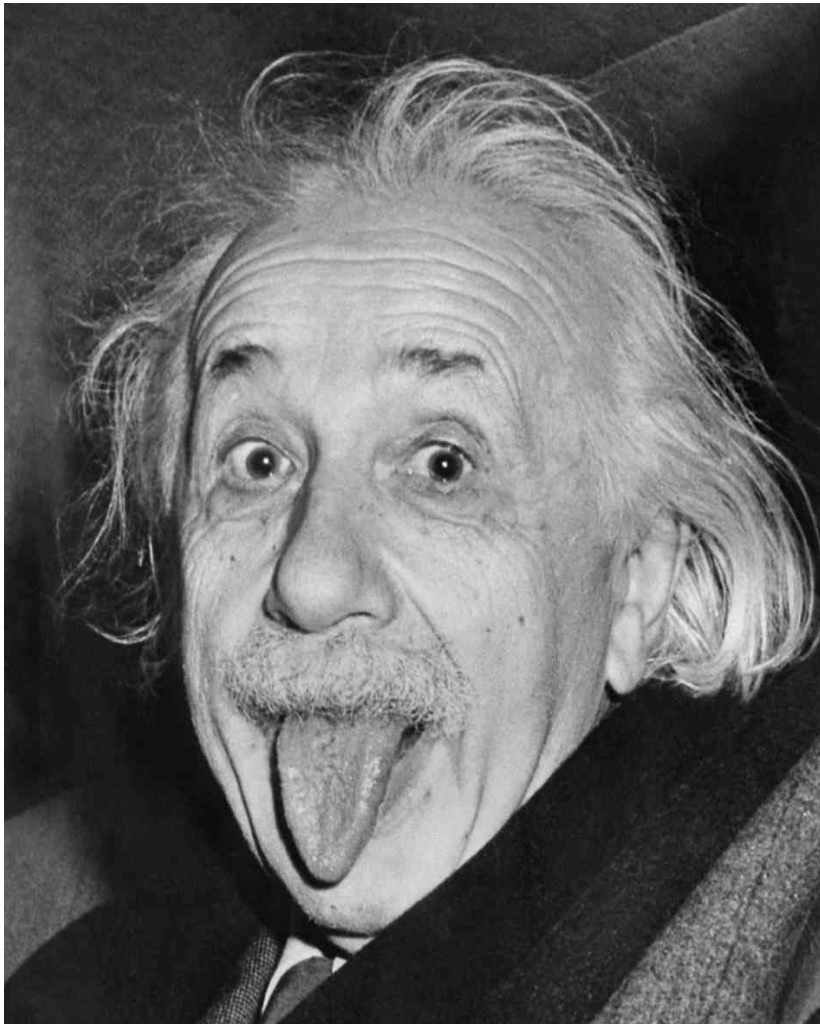
Y cómo obtengo energía eléctrica a partir de la luz...?



Efecto fotoeléctrico

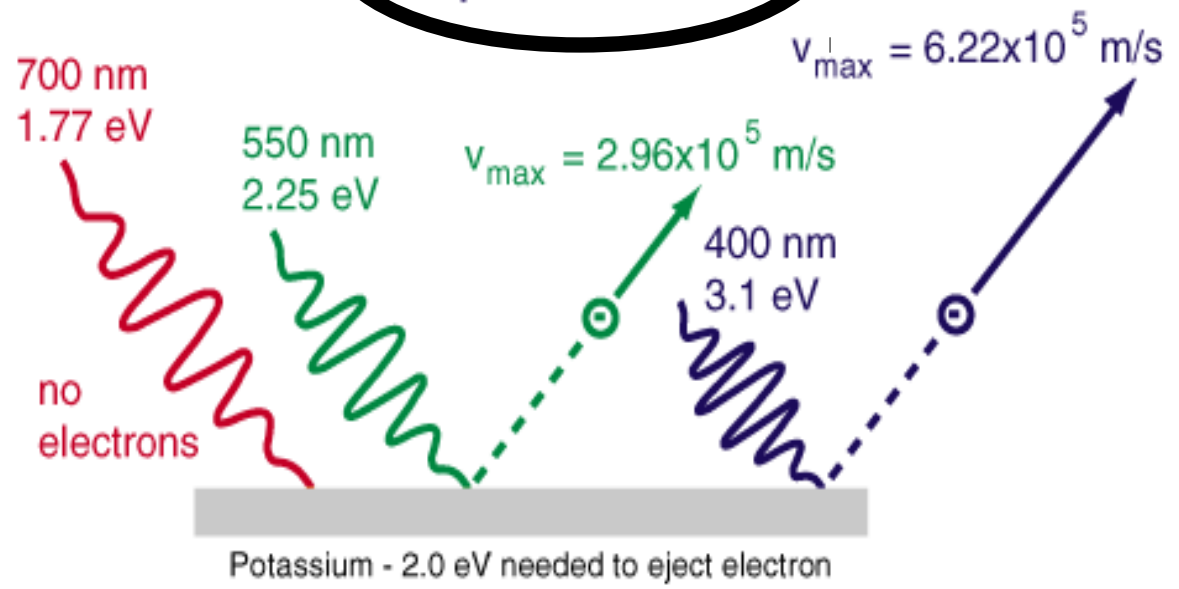


El tío Albert 1905



Max planck, radiación de cuerpo negro

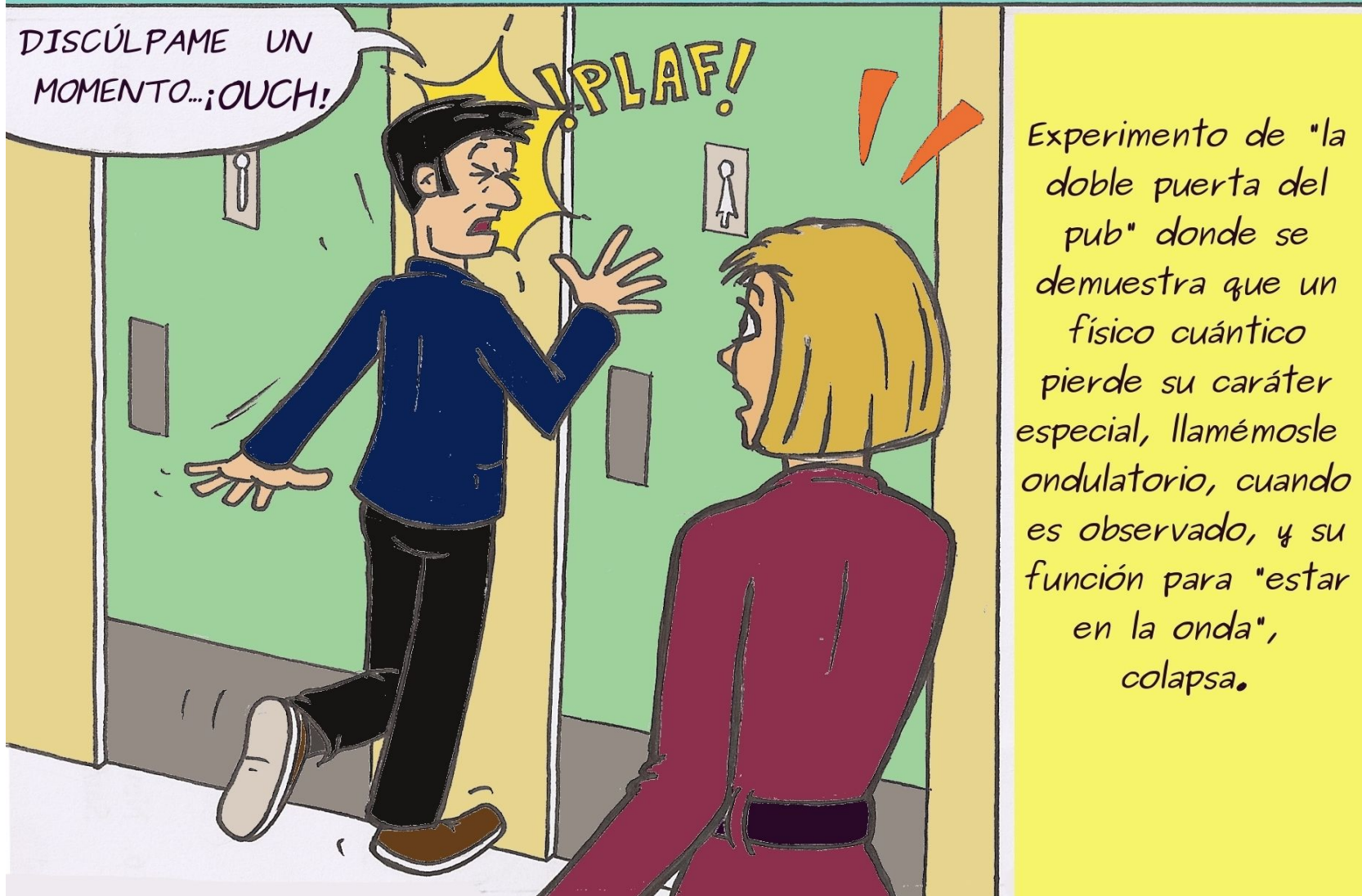
$$E_{\text{photon}} = h\nu$$



Photoelectric effect

Dualidad onda-partícula

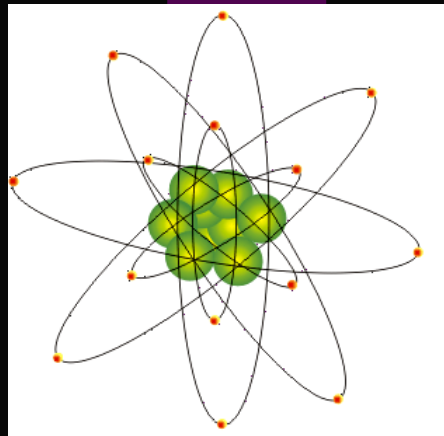
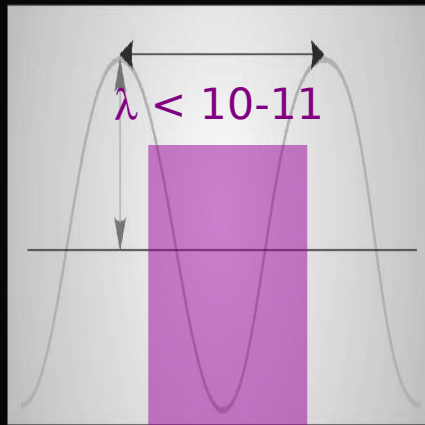
NUEVOS EXPERIMENTOS CUÁNTICOS



EL ESPECTRO E.M.



λ (m)
 $1\text{\AA} = 10^{-10} \text{ m}$

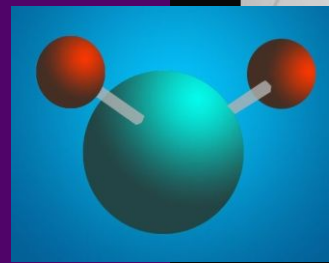
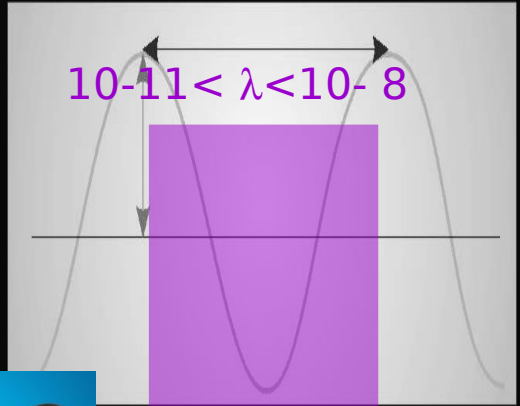




EL ESPECTRO E.M.



λ (m)
 $1\text{\AA} = 10^{-10} \text{ m}$

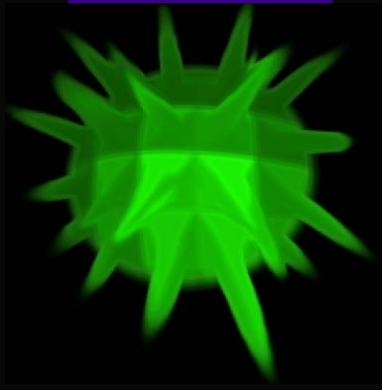
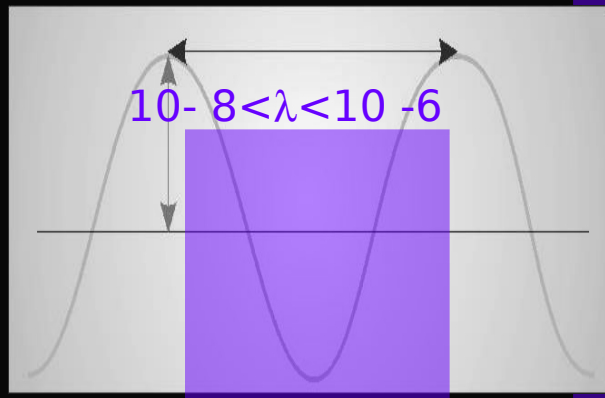




EL ESPECTRO E.M.



λ (m)
 $1\text{\AA} = 10^{-10} \text{ m}$

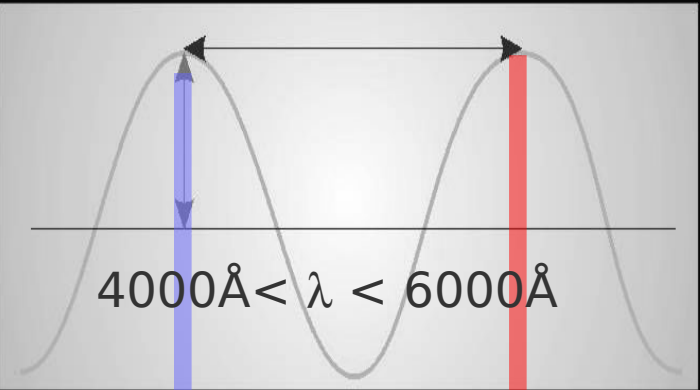




EL ESPECTRO E.M.



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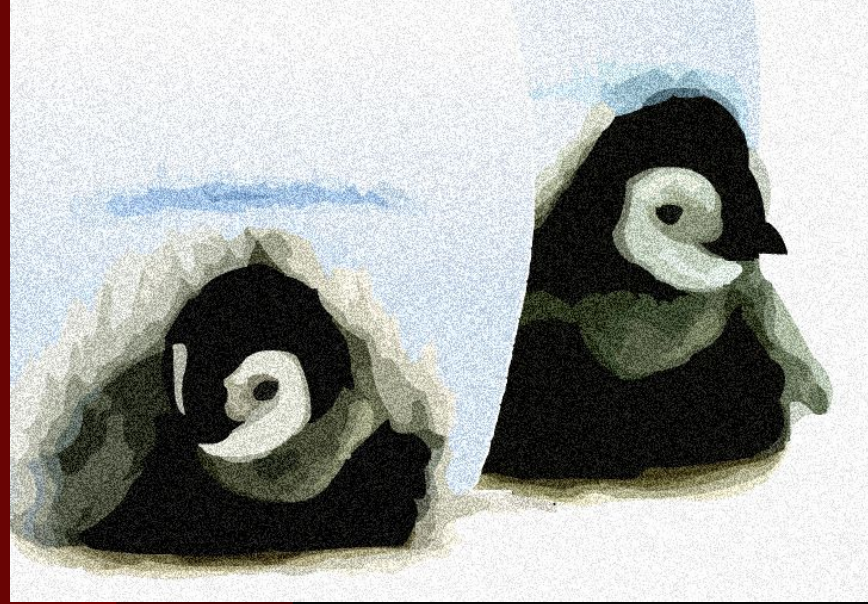
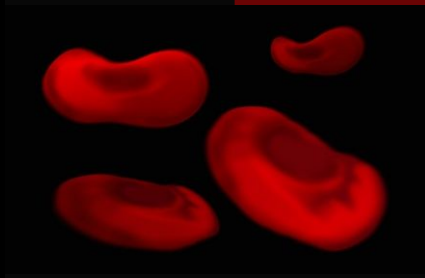
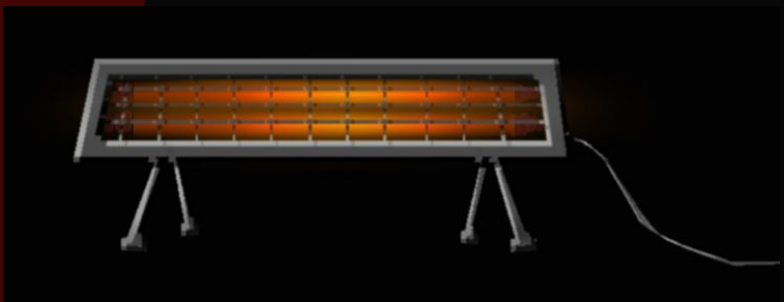
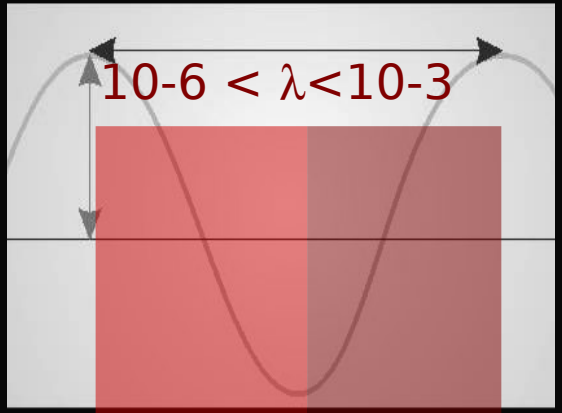




EL ESPECTRO E.M.



λ (m)
 $1\text{\AA} = 10^{-10} \text{ m}$

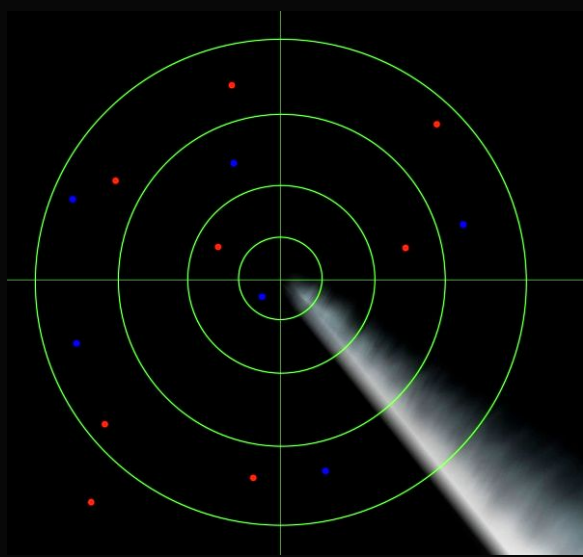
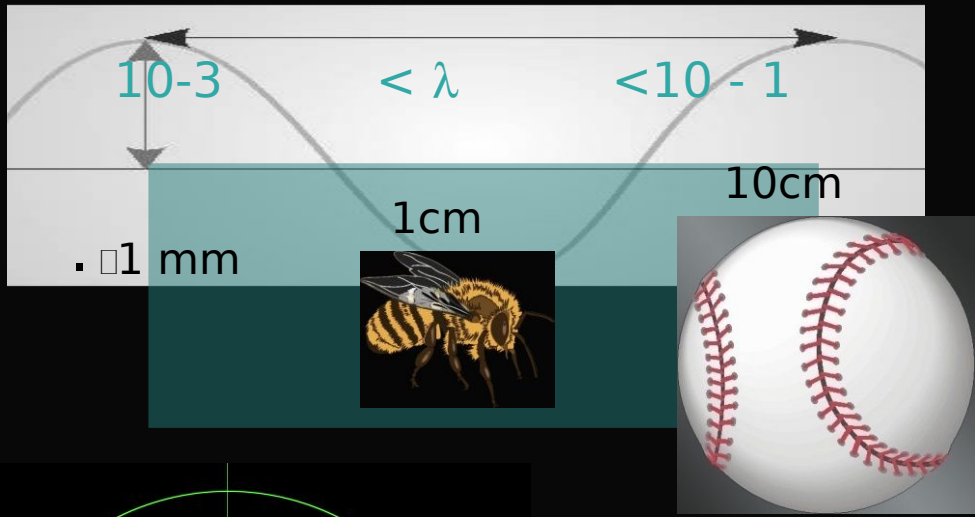




EL ESPECTRO E.M.



λ (m)
 $1\text{\AA} = 10^{-10} \text{ m}$





EL ESPECTRO E.M.



λ (m)
 $1\text{\AA} = 10^{-10} \text{ m}$

