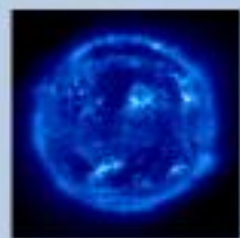

DIFRAÇÃO E INTERFERÊNCIA: APLICAÇÕES

ESPECTRO ELETROMAGNÉTICO



Tórax - Radiografia (InCor/HC-FMUSP)



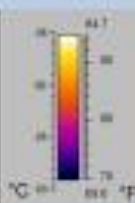
Sol - UltraVioleta (NASA)



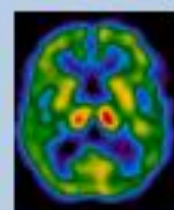
Blastocisto - M. Óptico (SciAm)



Cão - InfraVermelho (NASA)



Antenas TV/Rádio



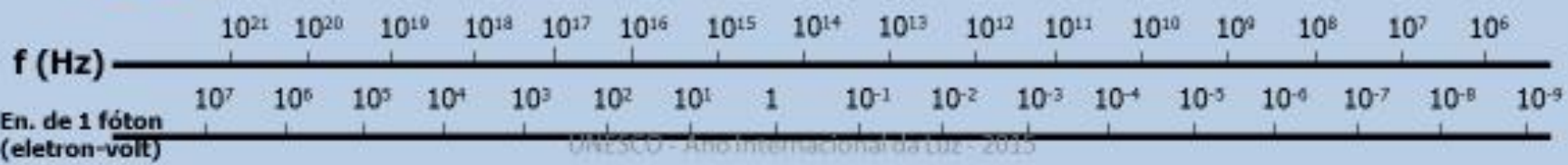
Cérebro - Tomografia por Emissão de Fótons / SPECT (InCor/HC-FMUSP)



Blastocisto dentro de célula - M. Elet. Varredura (SciAm)

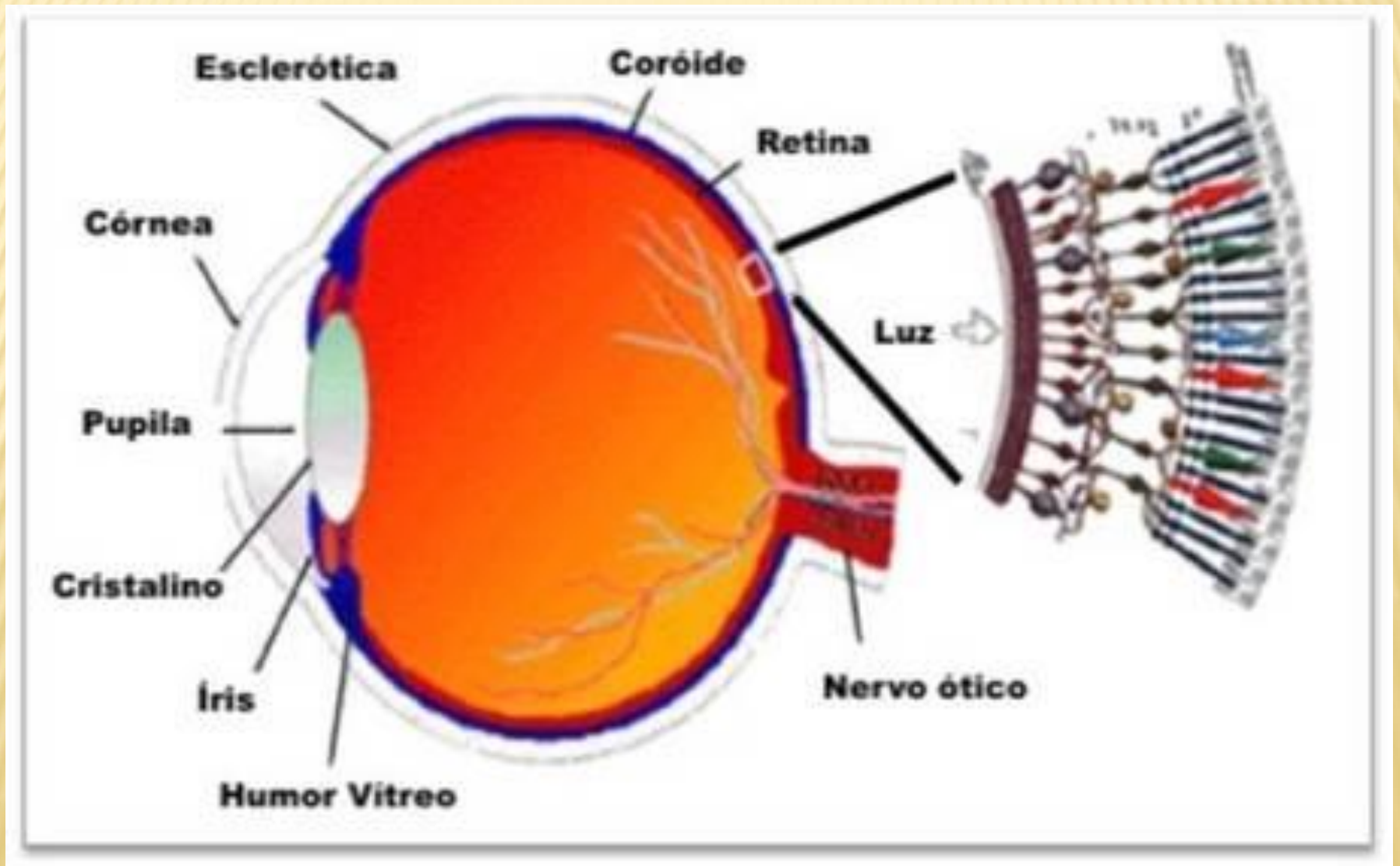


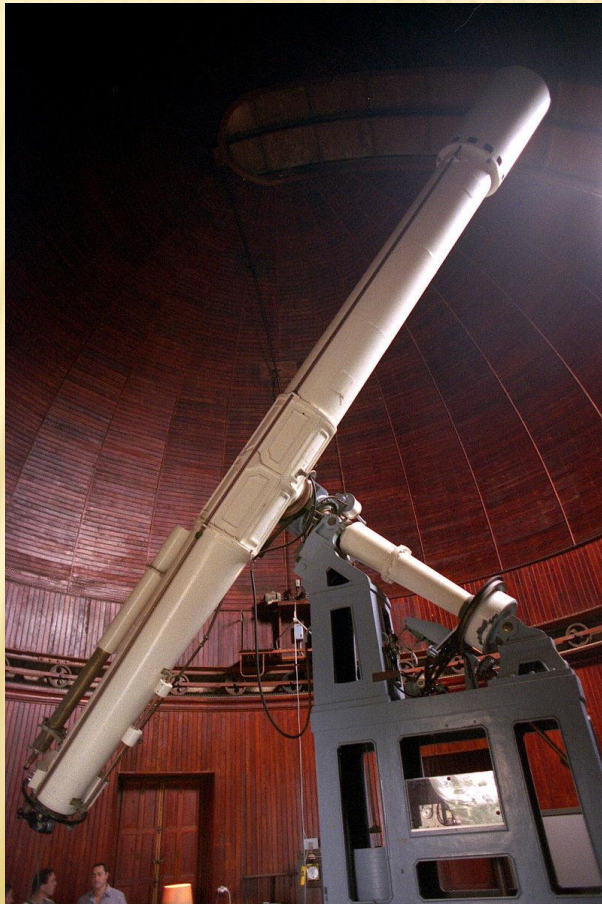
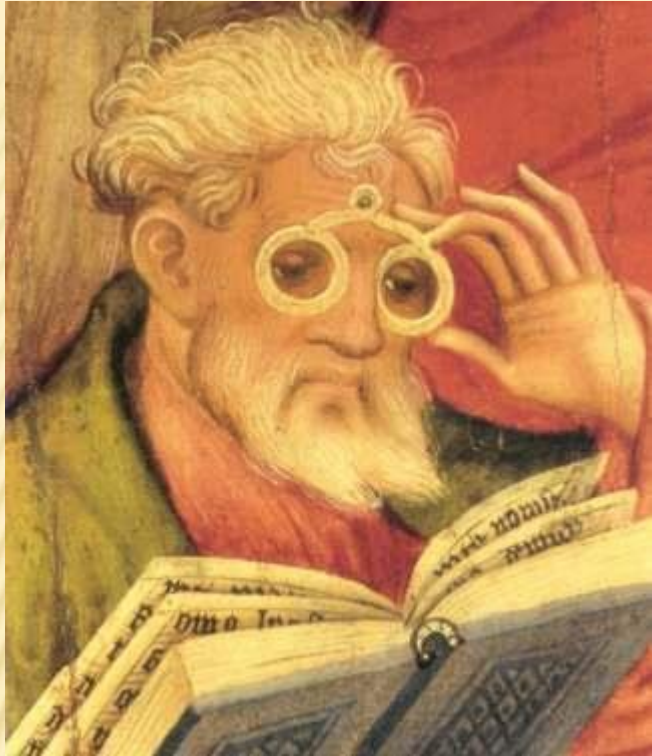
Forno Microondas (Electrolux)

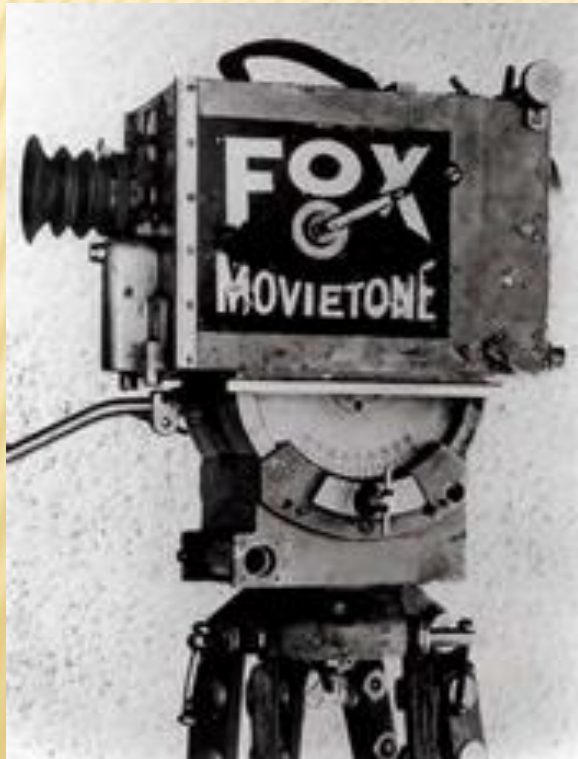




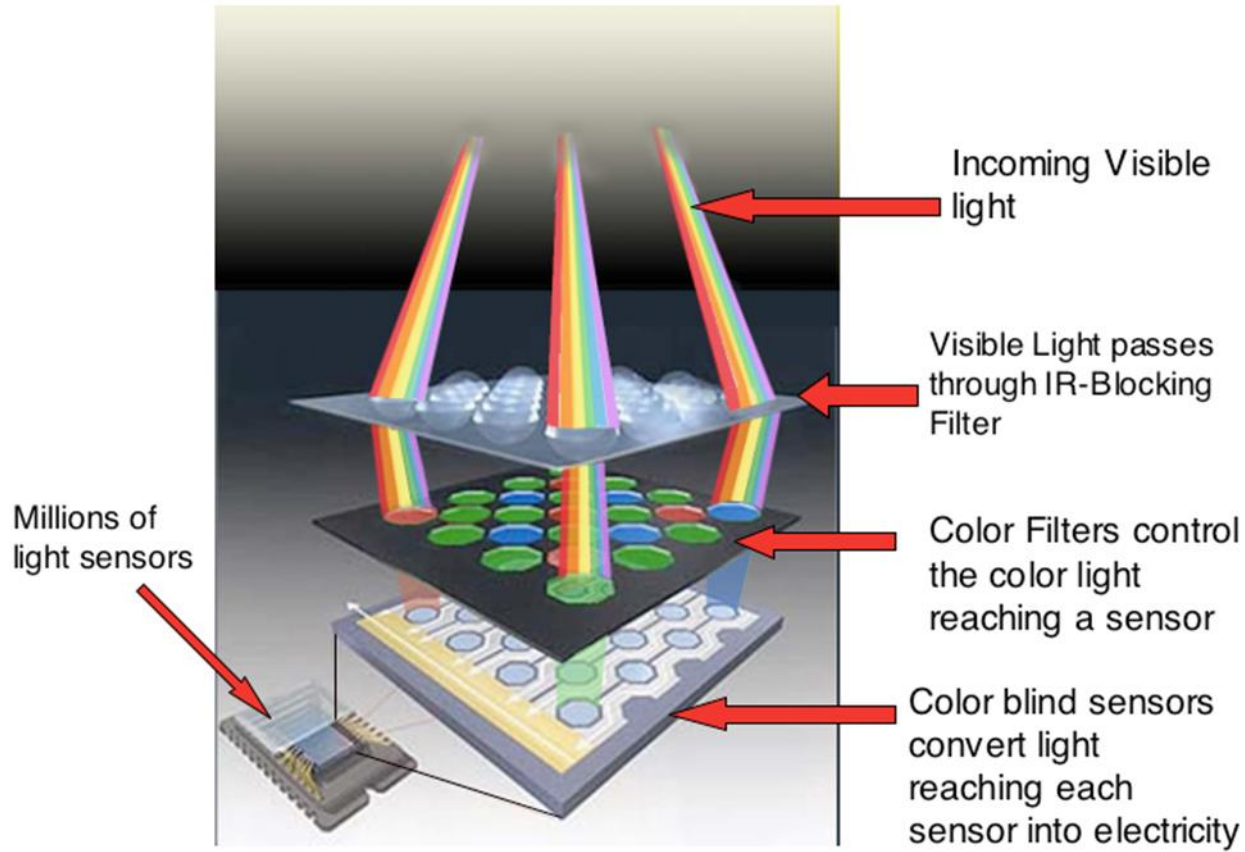
OLHO HUMANO

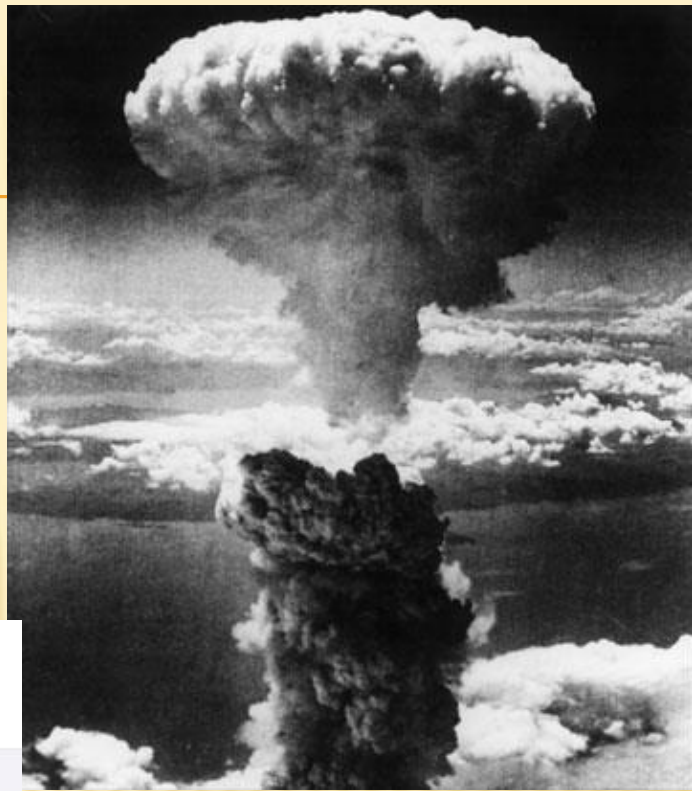
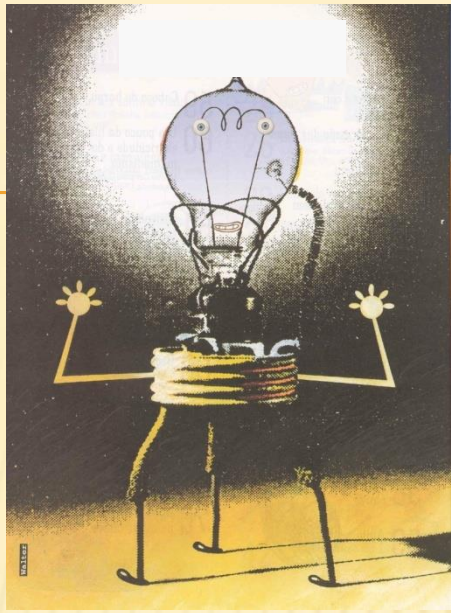






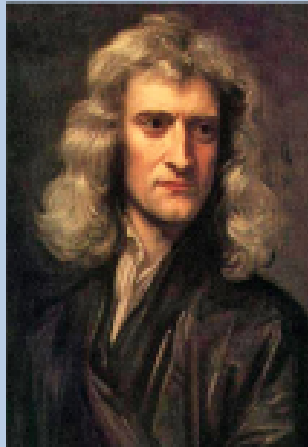
RGB Inside the Camera



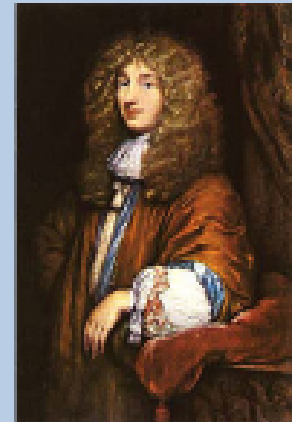


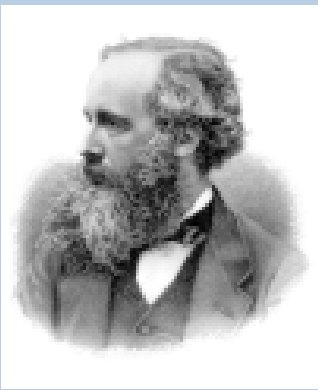
DIFRAÇÃO E INTERFERENCIA: breve revisão

NATUREZA DA LUZ

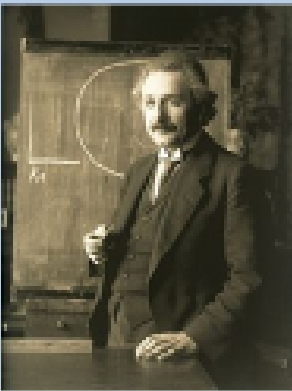


- ONDAS OU PARTICULAS ?
- ISAAC NEWTON : Teoria Corpuscular – reflexão e refração da luz
- Huygens e Hooke: Teoria Ondulatória – Difração da Luz.
- Young – 1800 : Interferência da luz
- Fresnel : Formalização da teoria da Difração e Interferência .

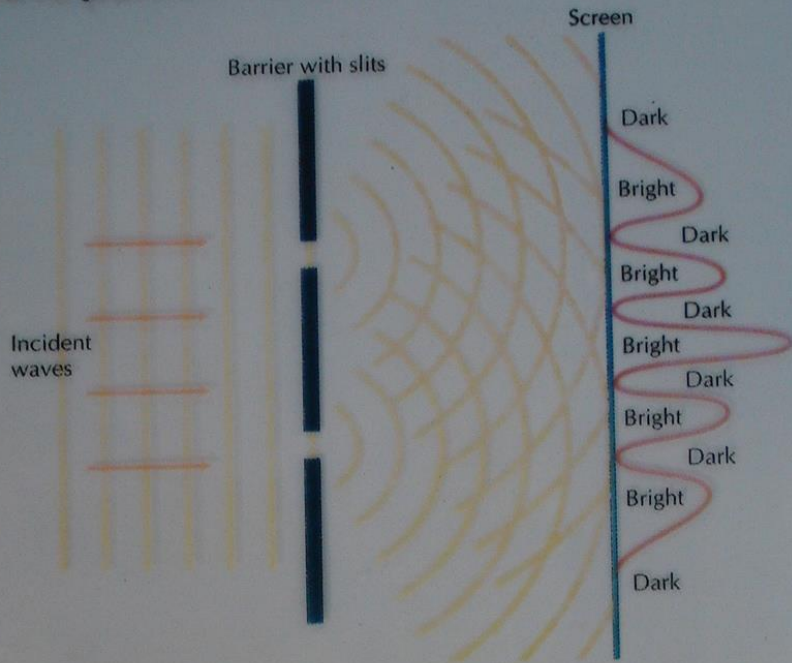




- Maxwell : 1865 – Formalização do eletromagnetismo
- Hertz : 1887 – LUZ É UMA ONDA ELETROMAGNÉTICA ! $C = 3 \times 10^8 \text{ m/s}$.
- Efeito Fotoelétrico – Einstein (1905).
- Modelo corpuscular da luz – Fótons.
- Natureza dual da luz (1920): Mecânica Quântica – Absorção e emissão da luz pela matéria.

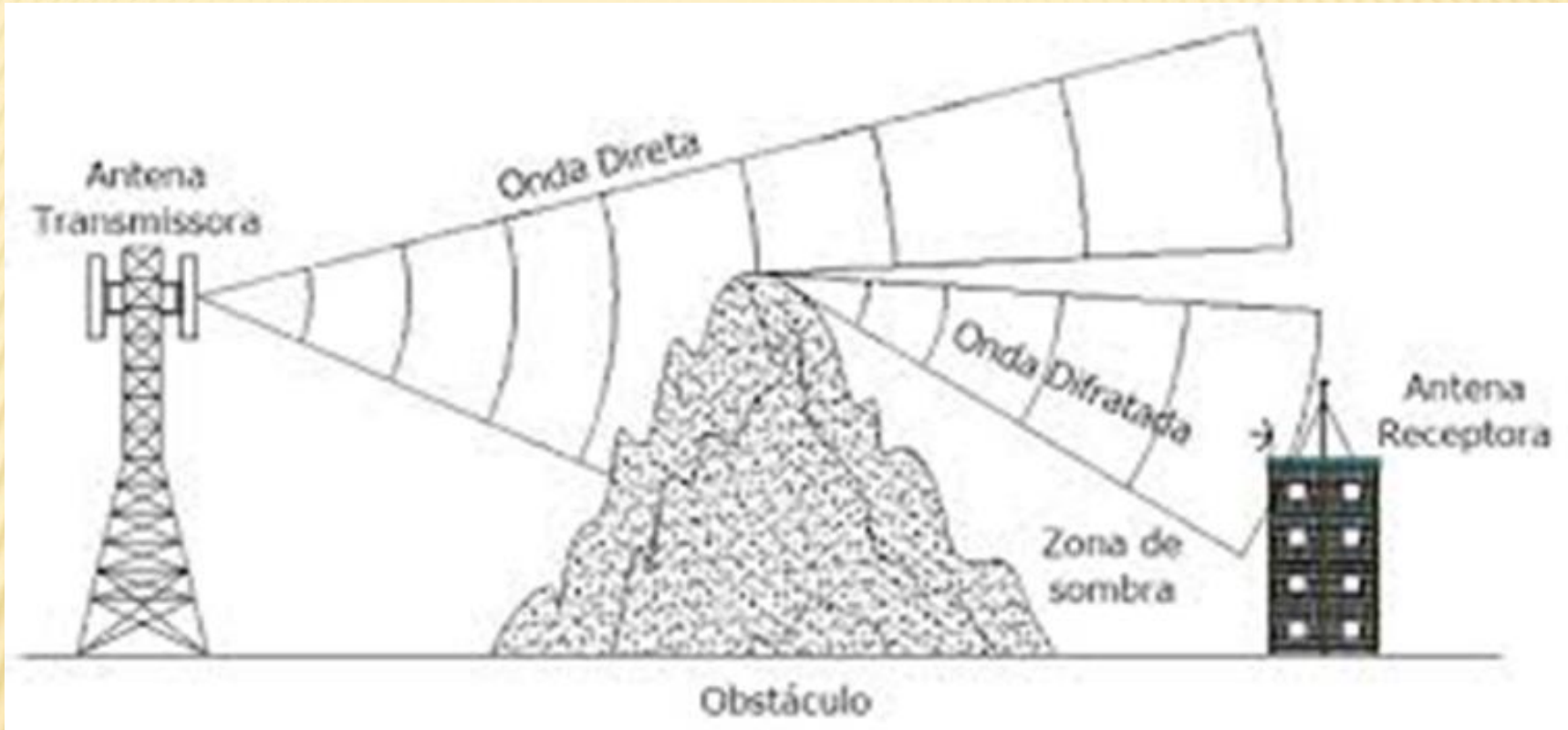


Two-slit wave particle behavior



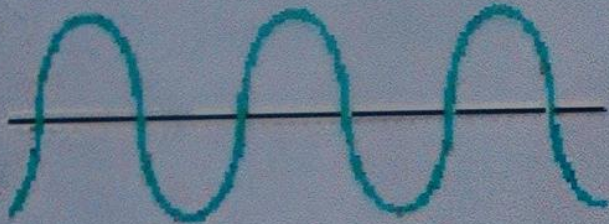
(a)



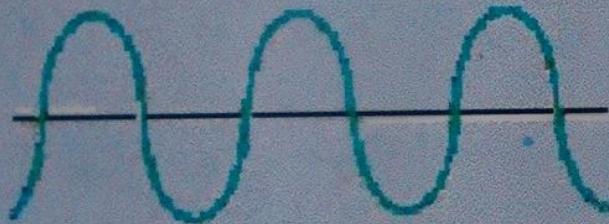


Interferência

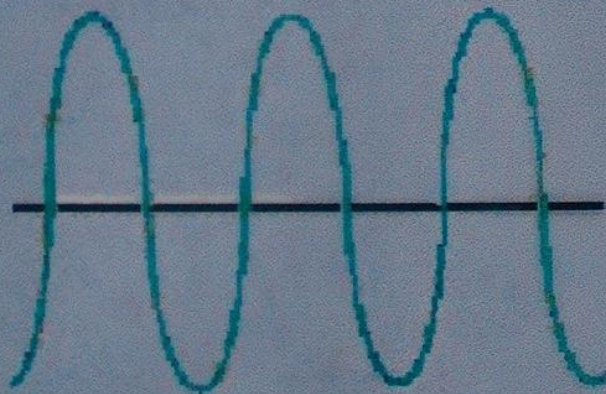
Onda 1



Onda 2

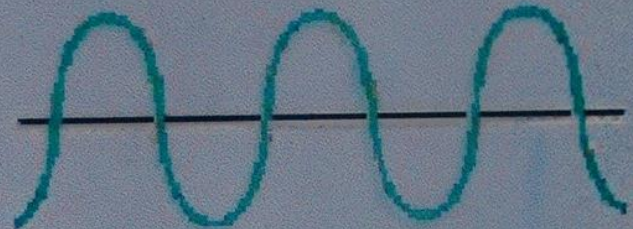


Onda 1 + Onda 2

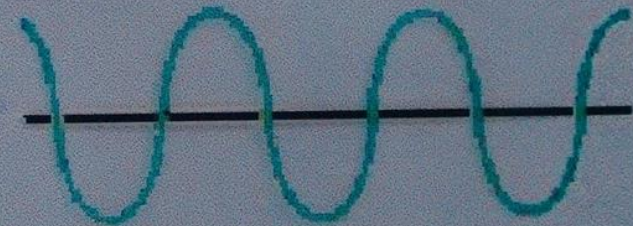


Interferência Construtiva

Onda 1



Onda 2



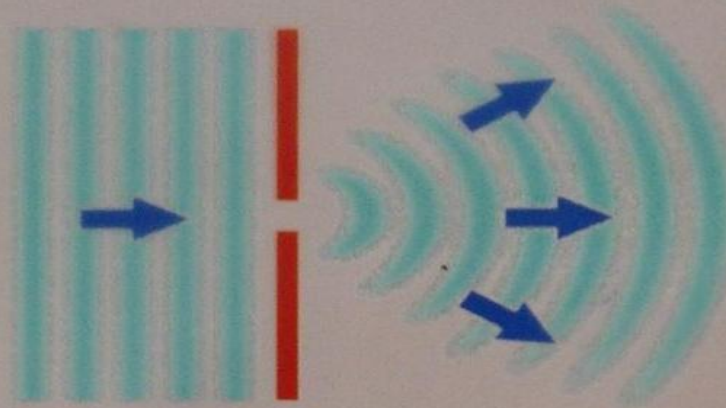
Onda 1 + Onda 2



Interferência Destrutiva

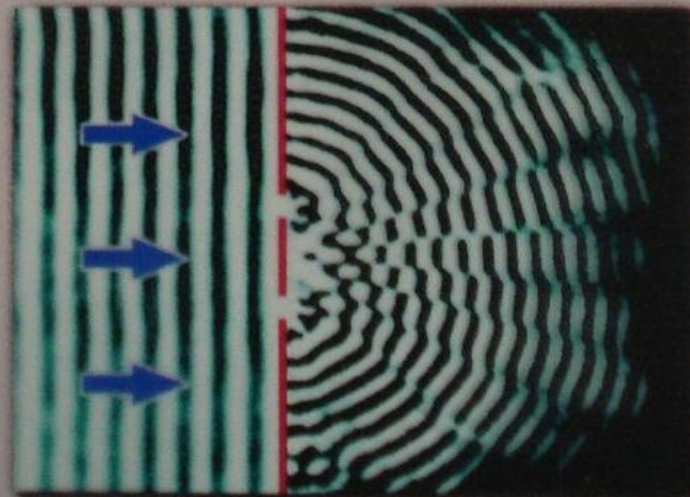
DIFRAÇÃO

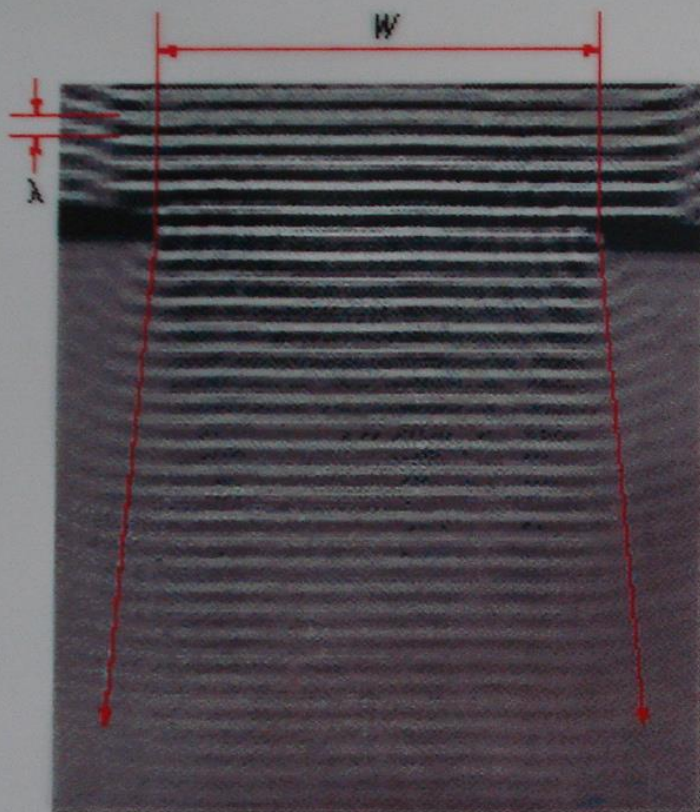
Desvio da onda (luz) ao passar por pequenas fendas ou obstáculos.



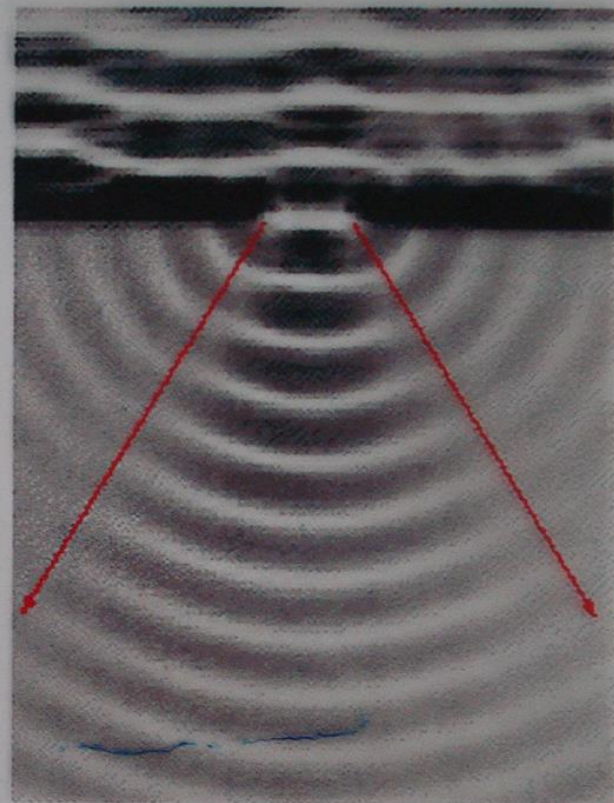
INTERFERÊNCIA

As ondas que difratam em S_1 e S_2 se interferem formando pontos de máxima e mínima intensidade.





(a) Smaller value for λ/W ,
less diffraction.

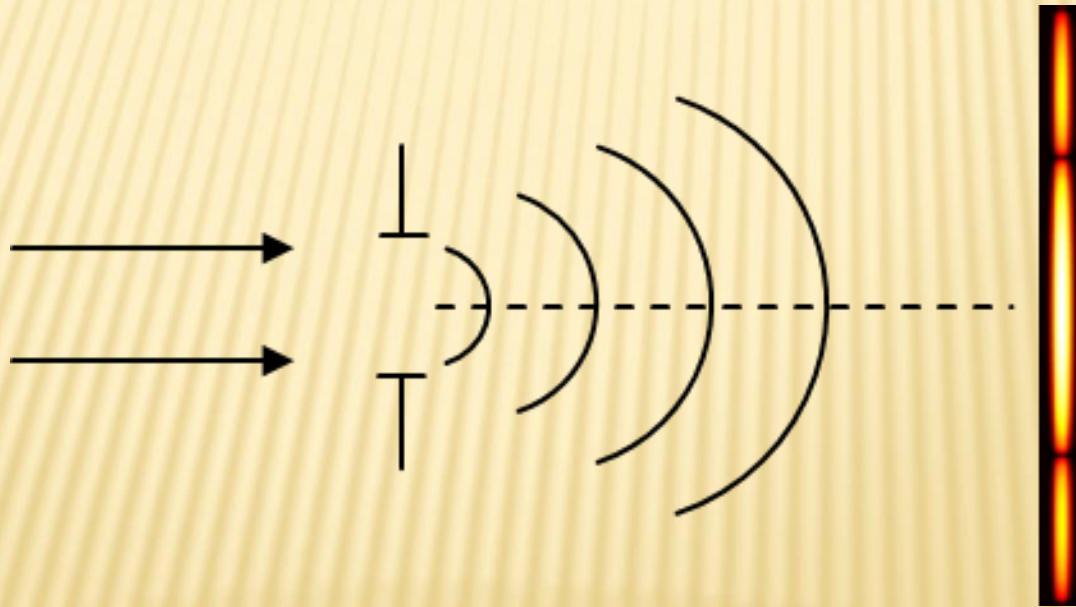


(b) Larger value for λ/W ,
more diffraction.

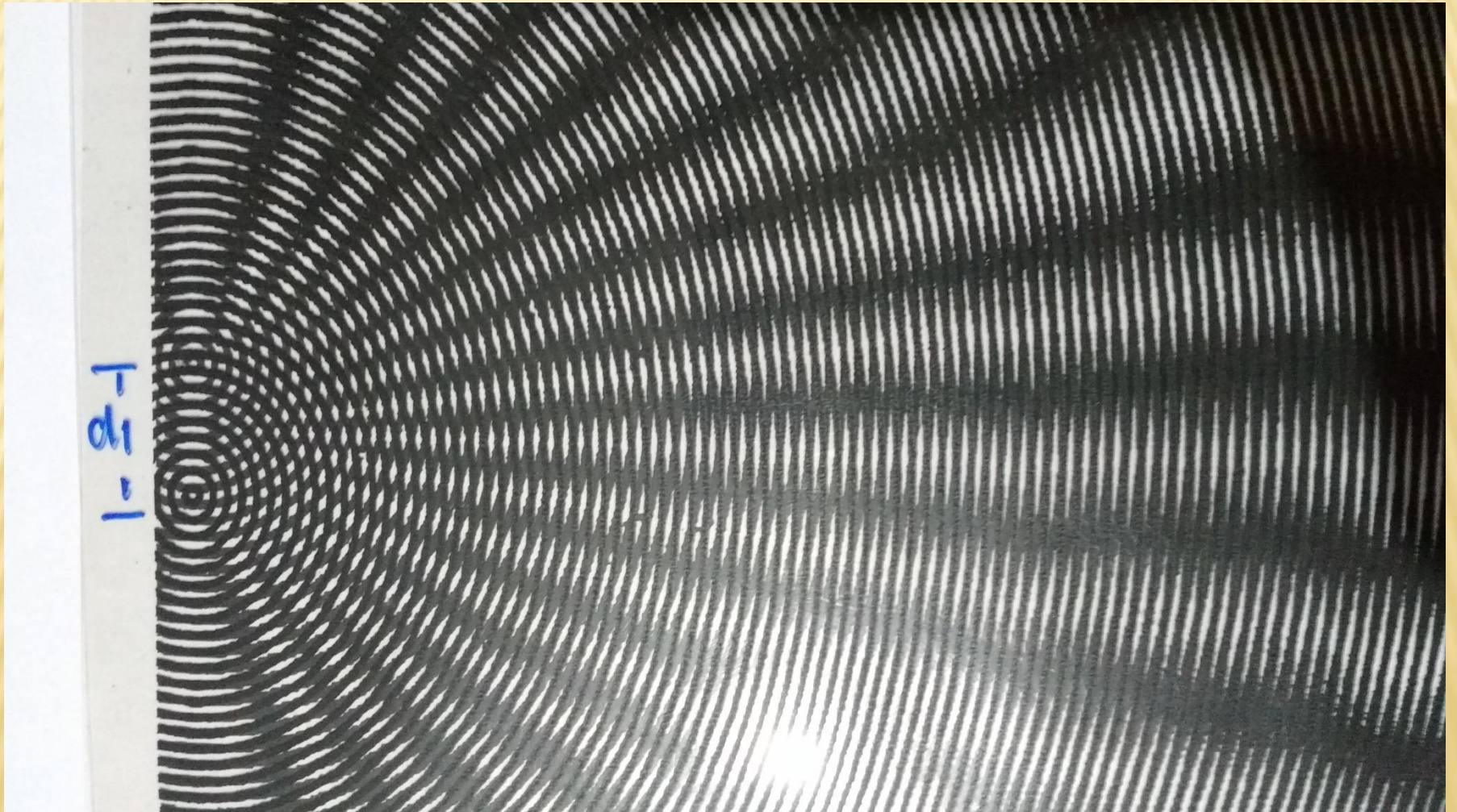
Figure 27.20 These photographs show water waves (horizontal lines) approaching an opening whose width W is smaller in (b) than it is in (a). In addition, the wavelength λ of the waves is larger in (b) than in (a). Therefore, the ratio λ/W increases from (a) to (b) and so does the extent of the diffraction, as indicated by the red arrows.

DIFRAÇÃO E INTERFERÊNCIA : EXEMPLOS

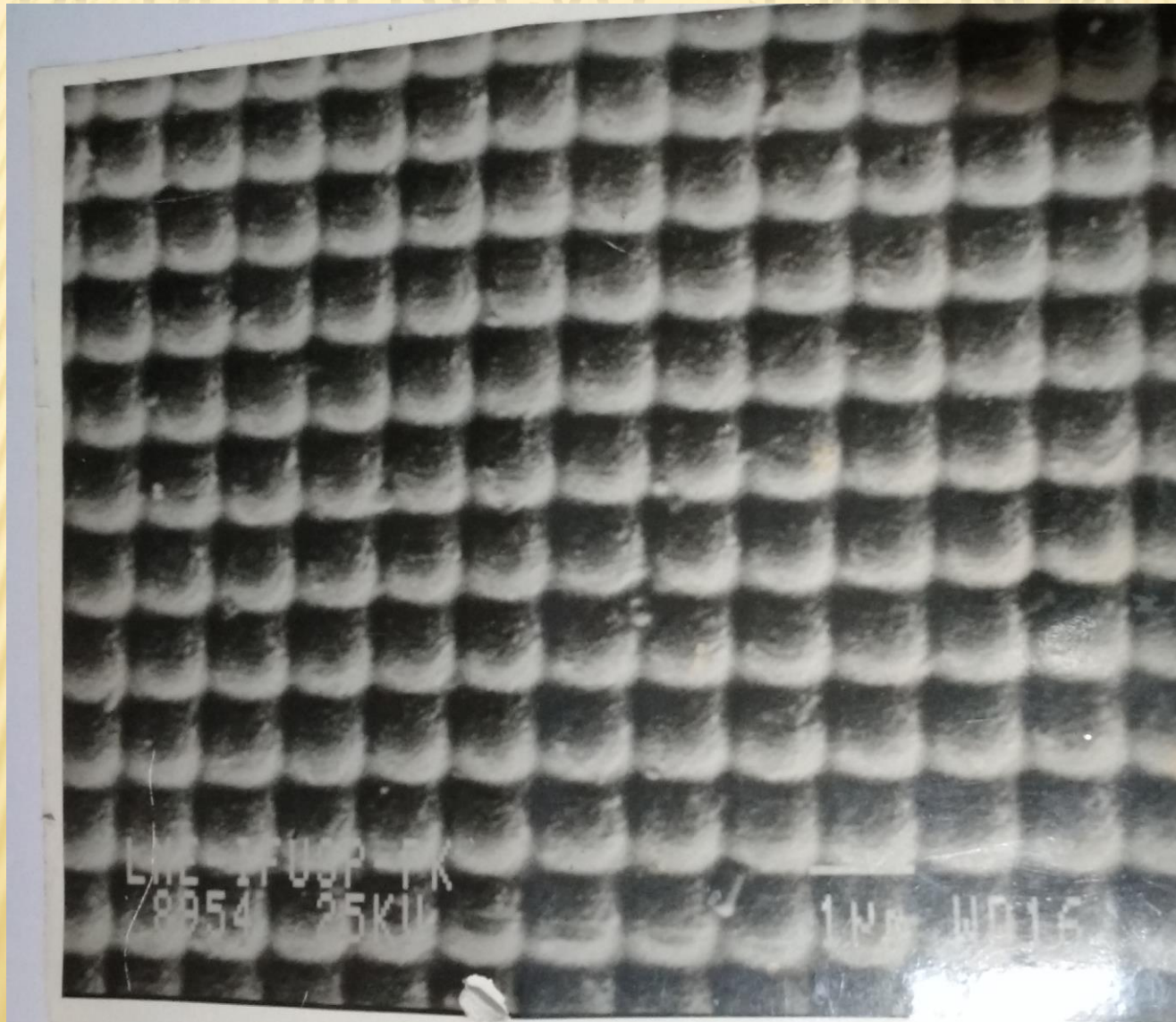
* FENDA SIMPLES



*FENDA DUPLA



REDE DE DIFRAÇÃO - 1 MICRON



PADRAO DE DIFRAÇÃO - LASER VERDE



PADRÃO DE DIFRAÇÃO – LASER VERMELHO



REDE DE DIFRAÇÃO - 1 MICRON



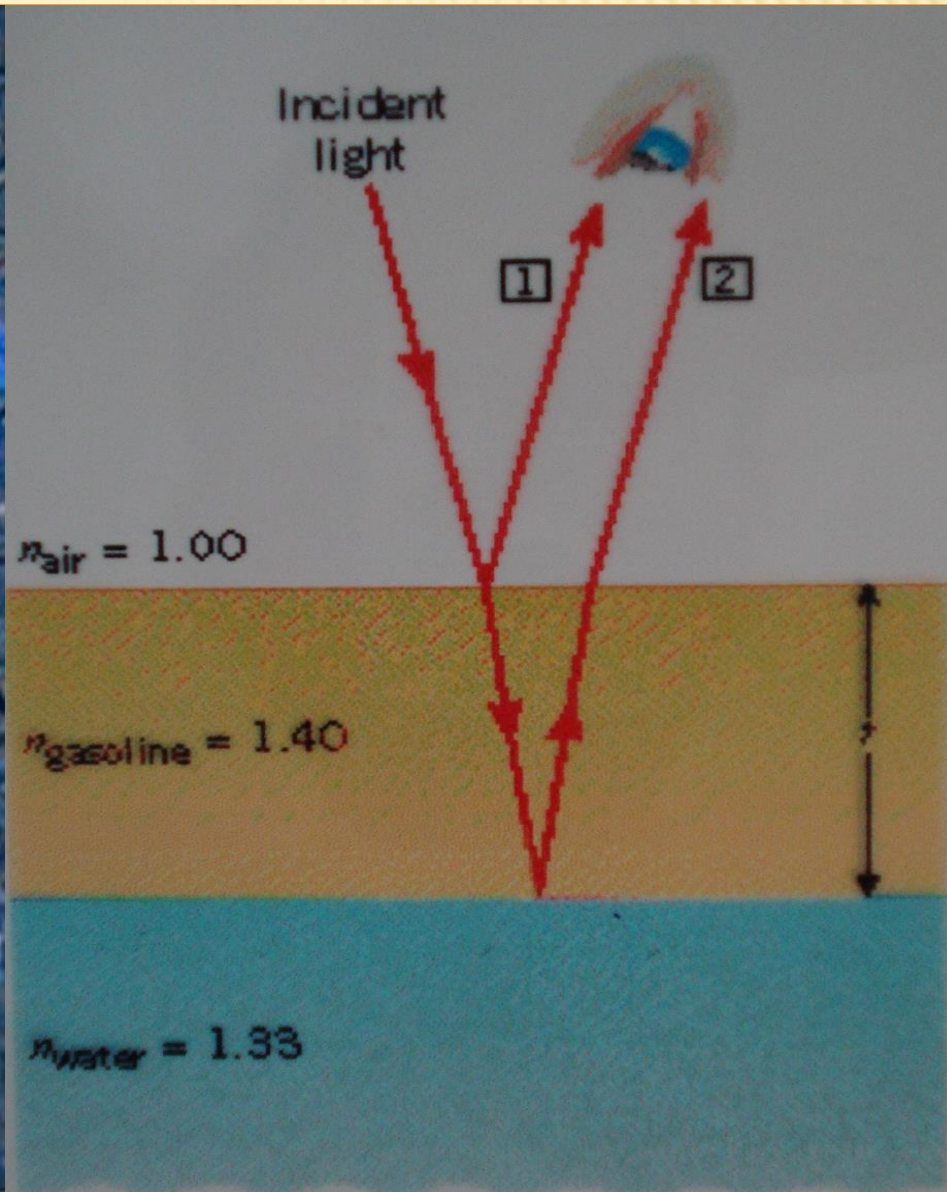
DIFRAÇÃO EM UM CD.



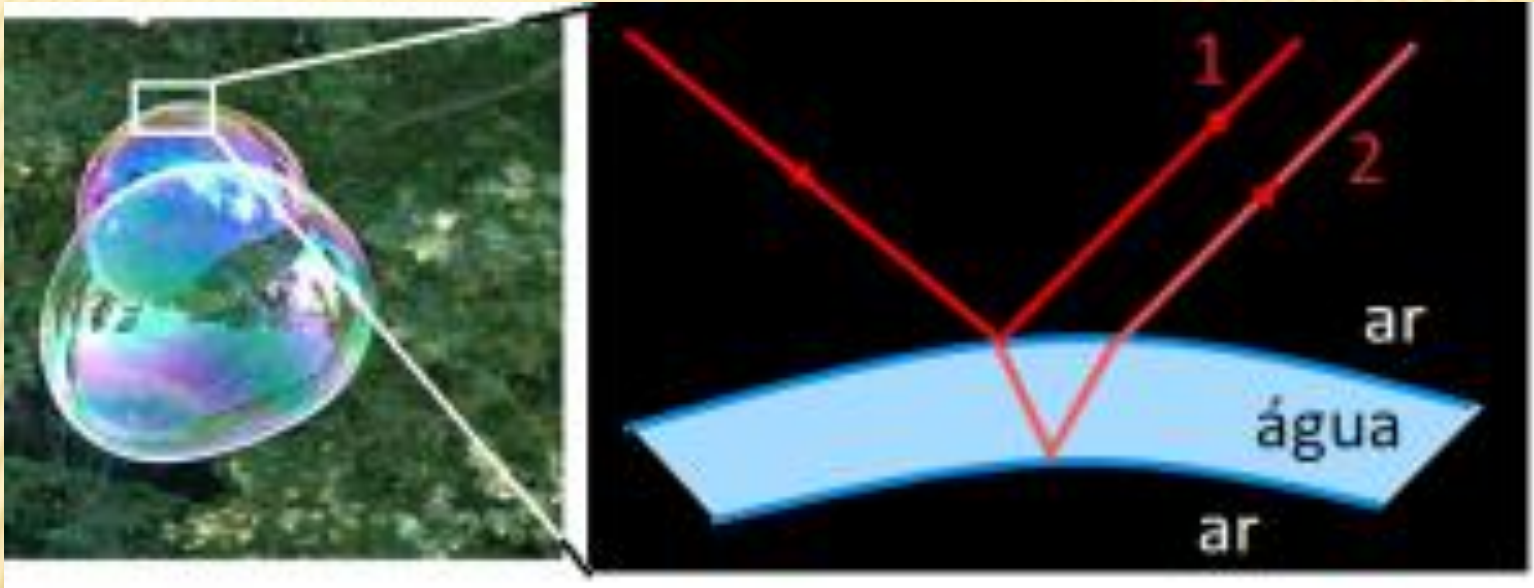
ESPECTROCOPIO : CAIXINHA + CD



INTERFERÊNCIA: MANCHA DE OLEO

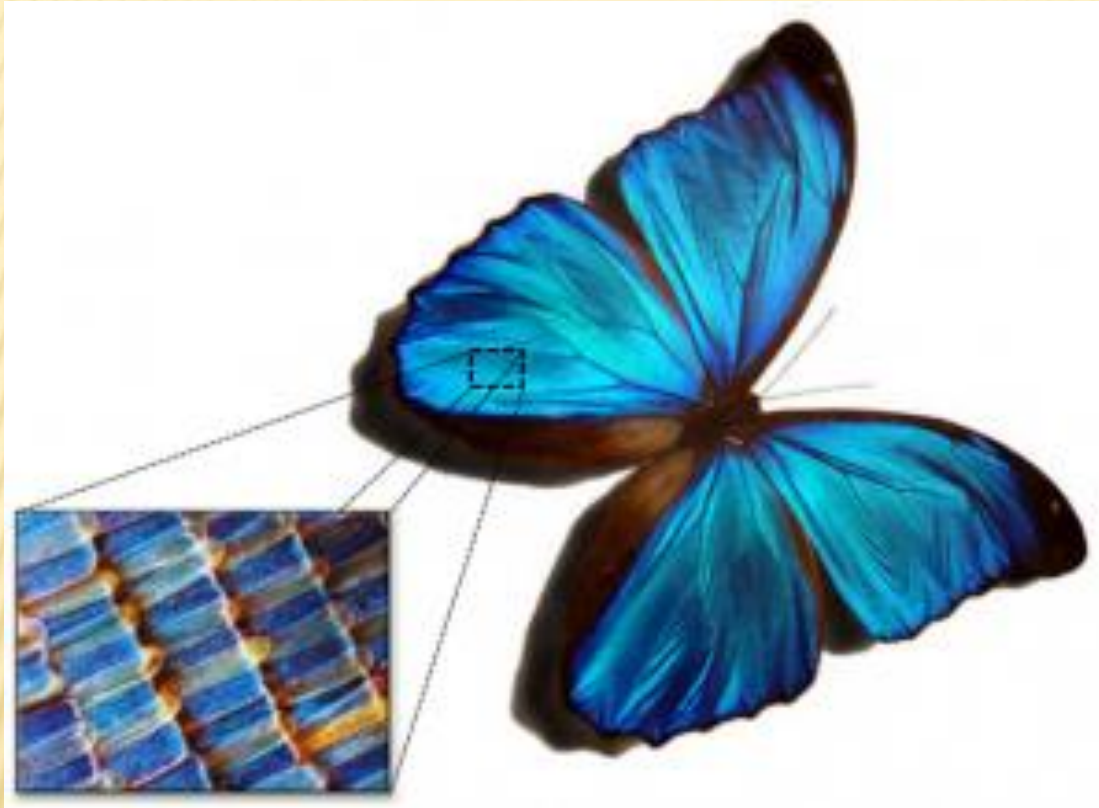


INTERFERÊNCIA: BOLHA DE SABÃO



<http://demonstracoes.fisica.ufmg.br/artigos/ver/96/15.-As-cores-das-bolhas-de-sabao>

INTERFERÊNCIA: CERTAS ASAS DE BORBOLETA



<http://demonstracoes.fisica.ufmg.br/artigos/ver/96/15.-As-cores-das-bolhas-de-sabao>

INTERFERÊNCIA: LENTE ANTI-REFLEXO

