

Aula 9 - Espectro eletromagnético

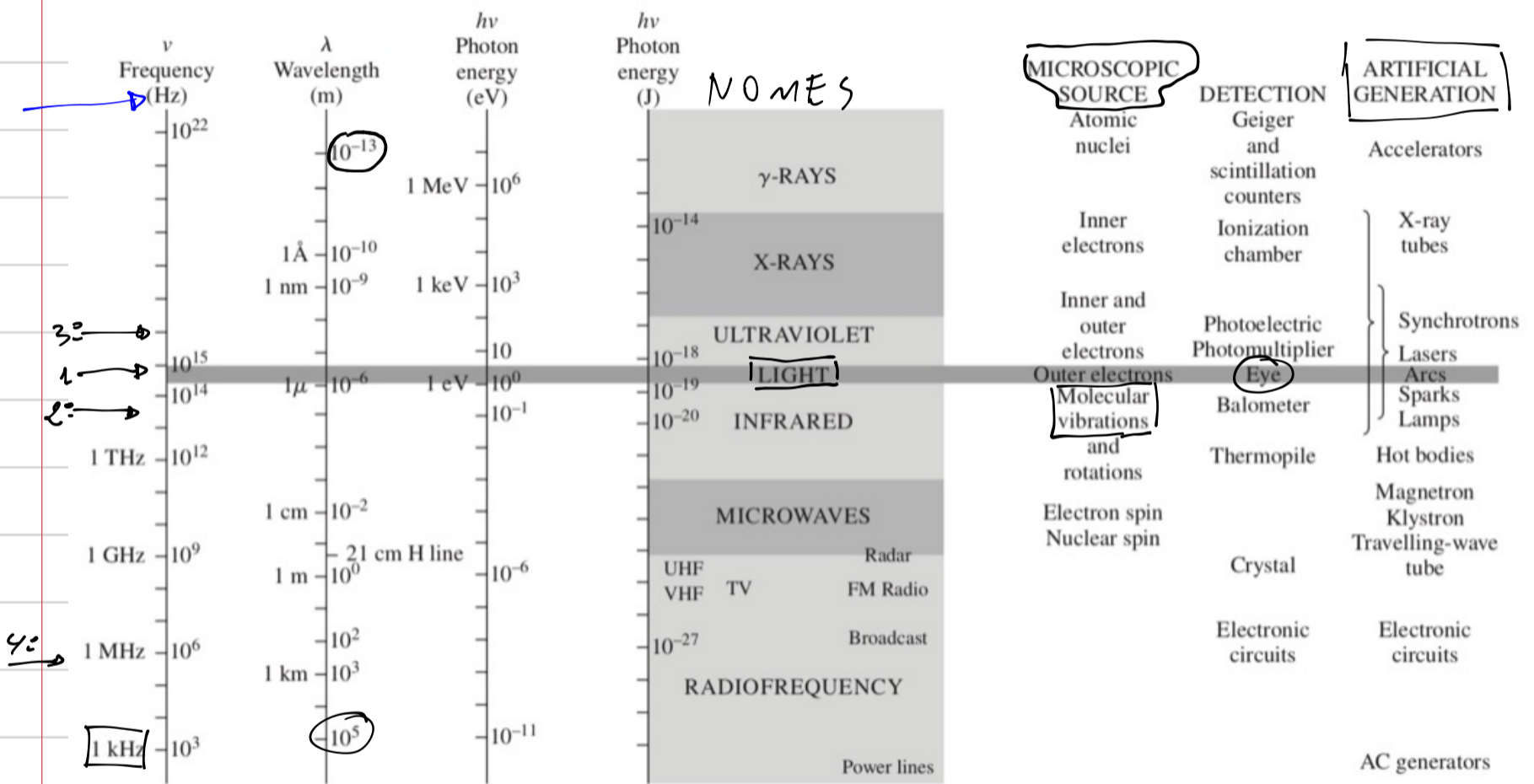


Figure 3.43 The electromagnetic-photon spectrum.

→ Radiação visível ao olho humano
 → luz, Newton - 1666 olho = detector

→ Radiação Infravermelha, William Herschel, 1800
 detector = termômetro

→ Rad. Ultravioleta, Johan Ritter, 1801
 detector: ~~Sulfeto de prata~~ cloreto

→ Rad. orig. dos circuitos elétricos

Maxwell detector = circuitos 1867

→ Radiação Eletromagnética observada experimentalmente por Hertz 1887

→ Qual é o limite inferior e superior para o comprimento de onda, frequência, de uma onda eletromagnética

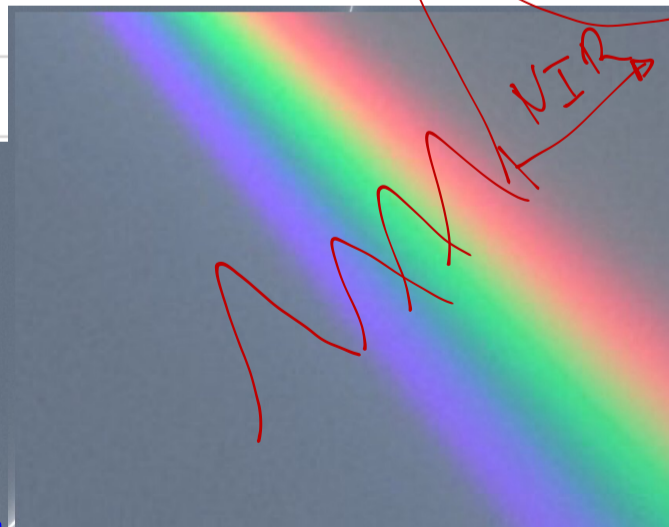
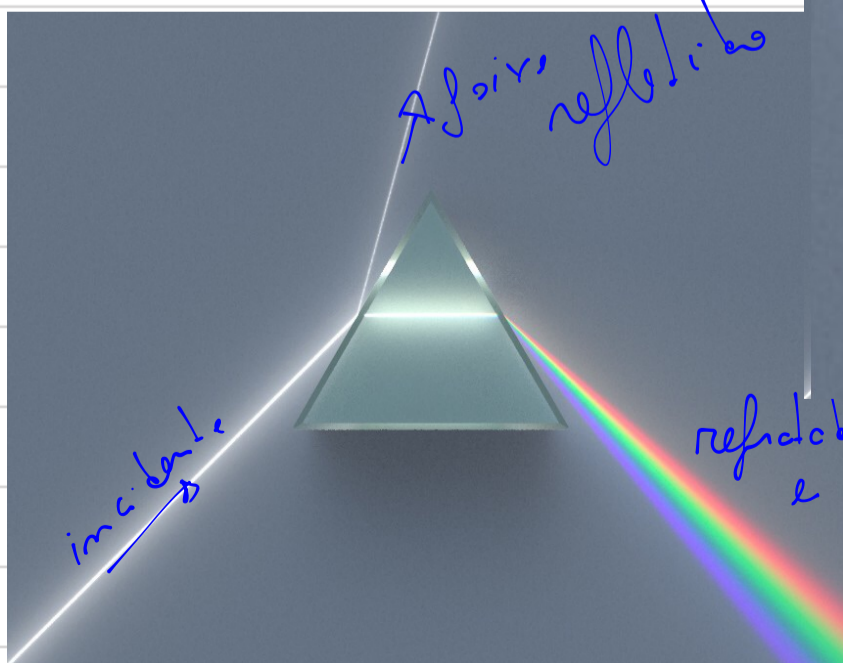
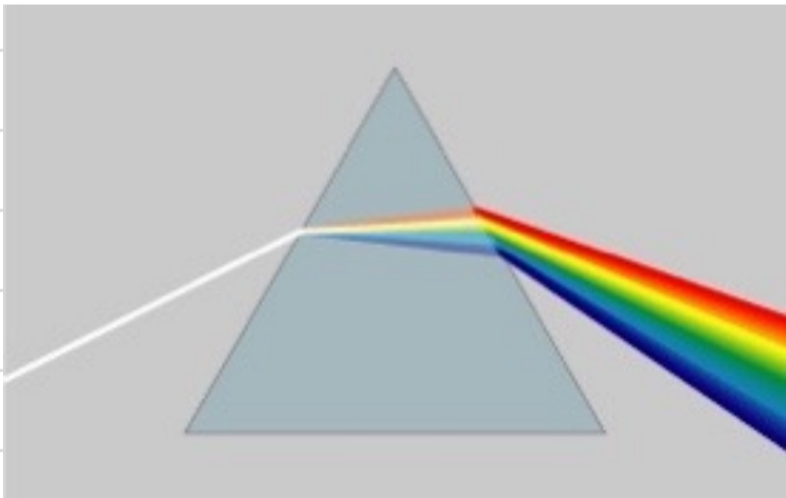
Radiação óptica

- UV
- Visível
- Infravermelho

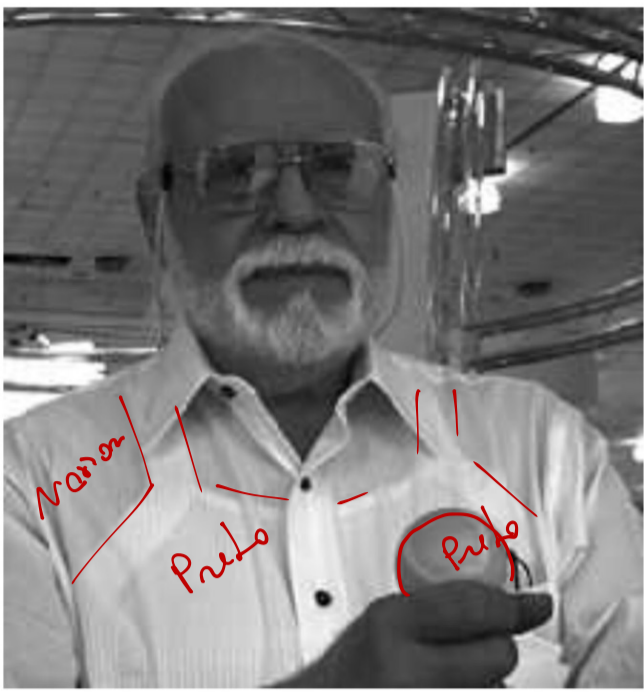
TABLE 3.4 Approximate Frequency and Vacuum Wavelength Ranges for the Various Colors

Color	λ_0 (nm)	ν (THz)*
Red	780-622	384-482
Orange	622-597	482-503
Yellow	597-577	503-520
Green	577-492	520-610
Blue	492-455	610-659
Violet	455-390	659-769

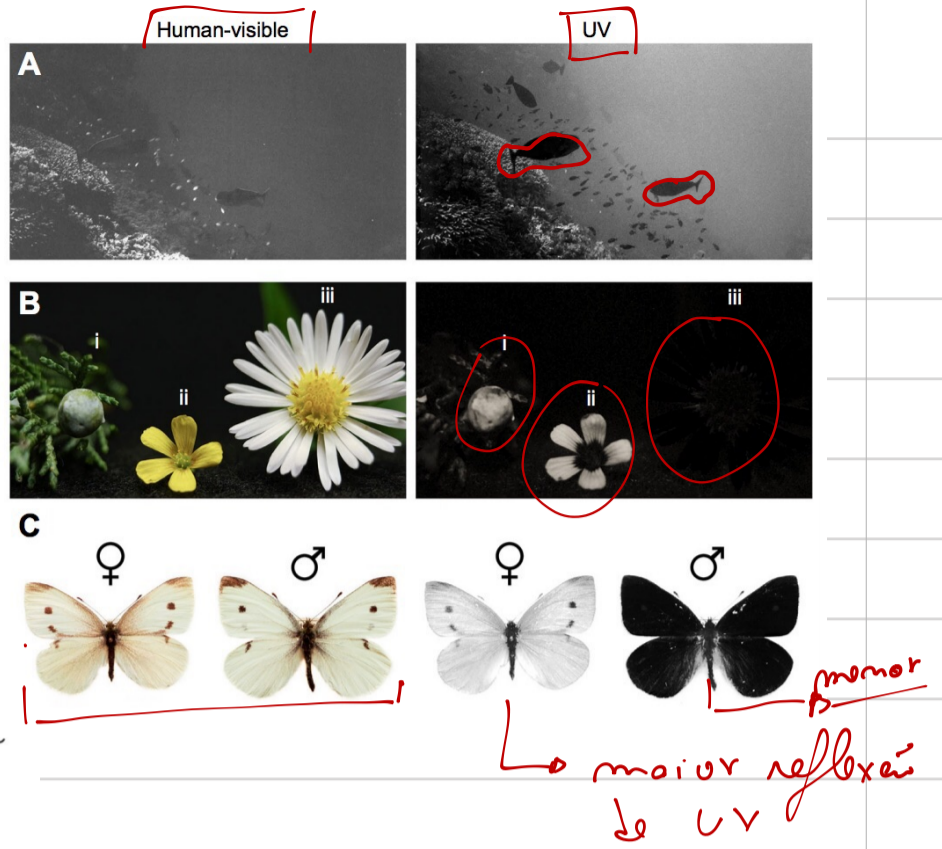
*1 terahertz (THz) = 10^{12} Hz, 1 nanometer (nm) = 10^{-9} m.



NIR = Near Infra Red



An IR photo. In the visible, the shirt was dark brown and the undershirt, like the ball, was black. (E.H.)



memor
A maior reflexão de UV



Infra Vermelho
visível
- 2µm — 10µm
2.000 — 10.000 nm



Fórmulas Radiogaz Óptica

10 mm UV 400 780 50.000 mm

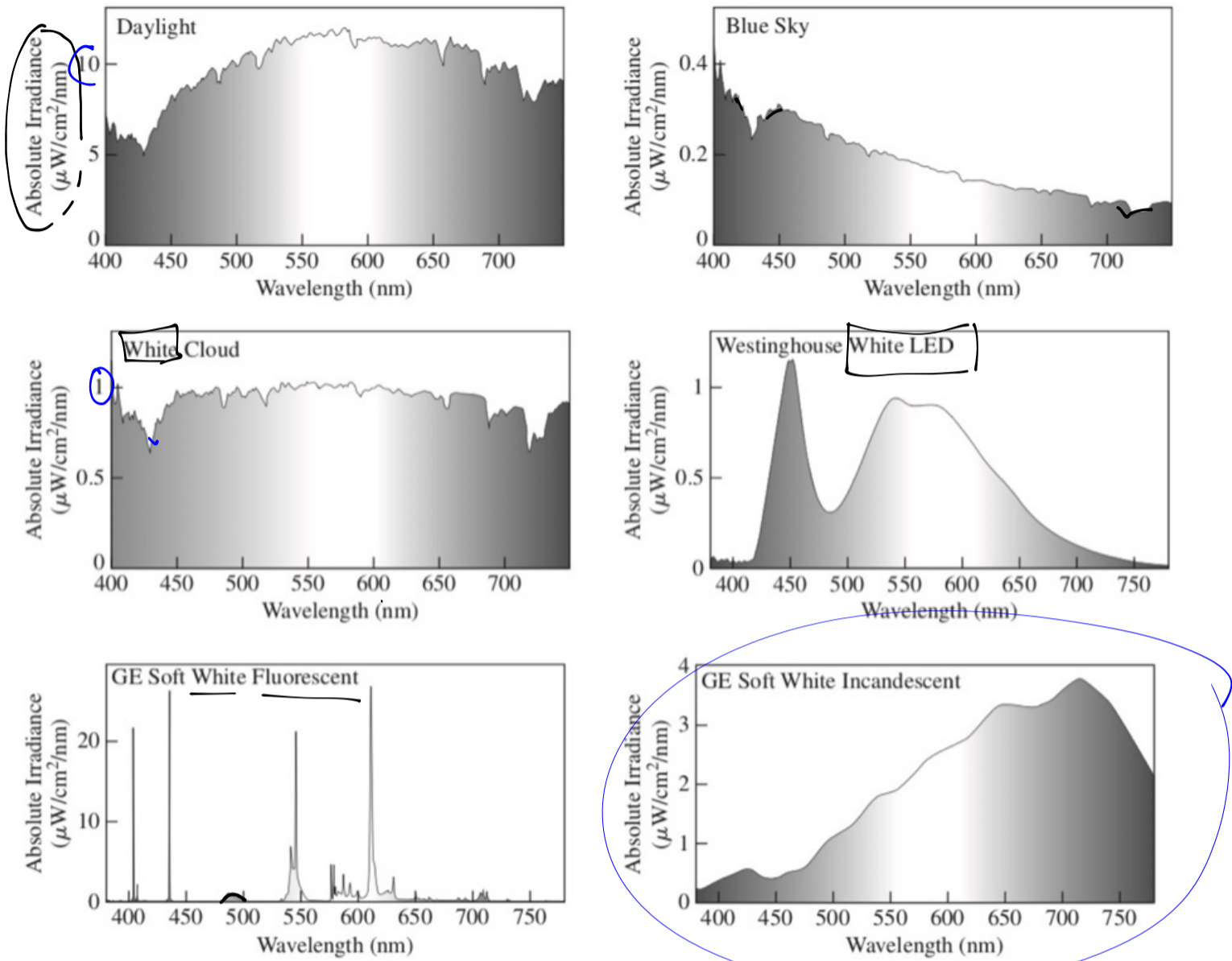
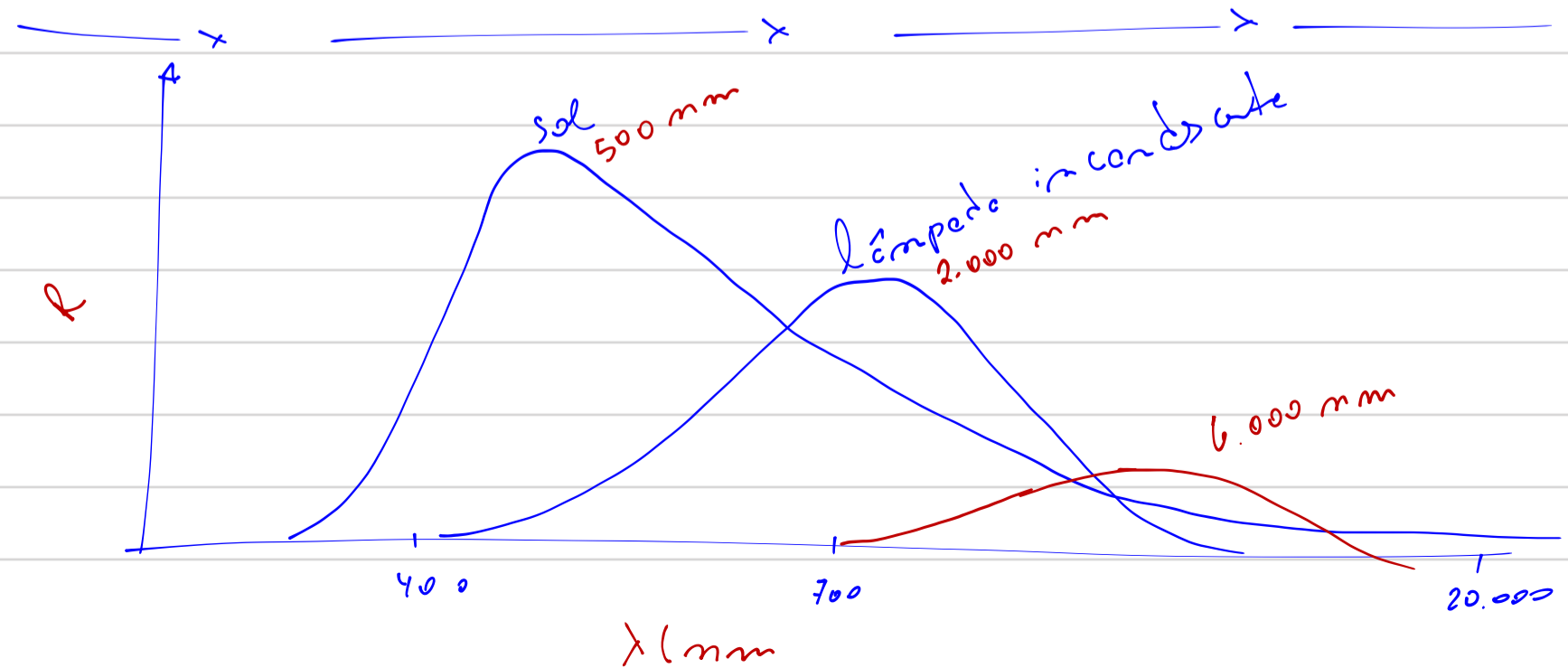


Figure 3.44 Various spectral distributions of light. (Dr. Gottipaty N. Rao, Adelpi University)

→ Branco Padrão → Sulfato de Bário



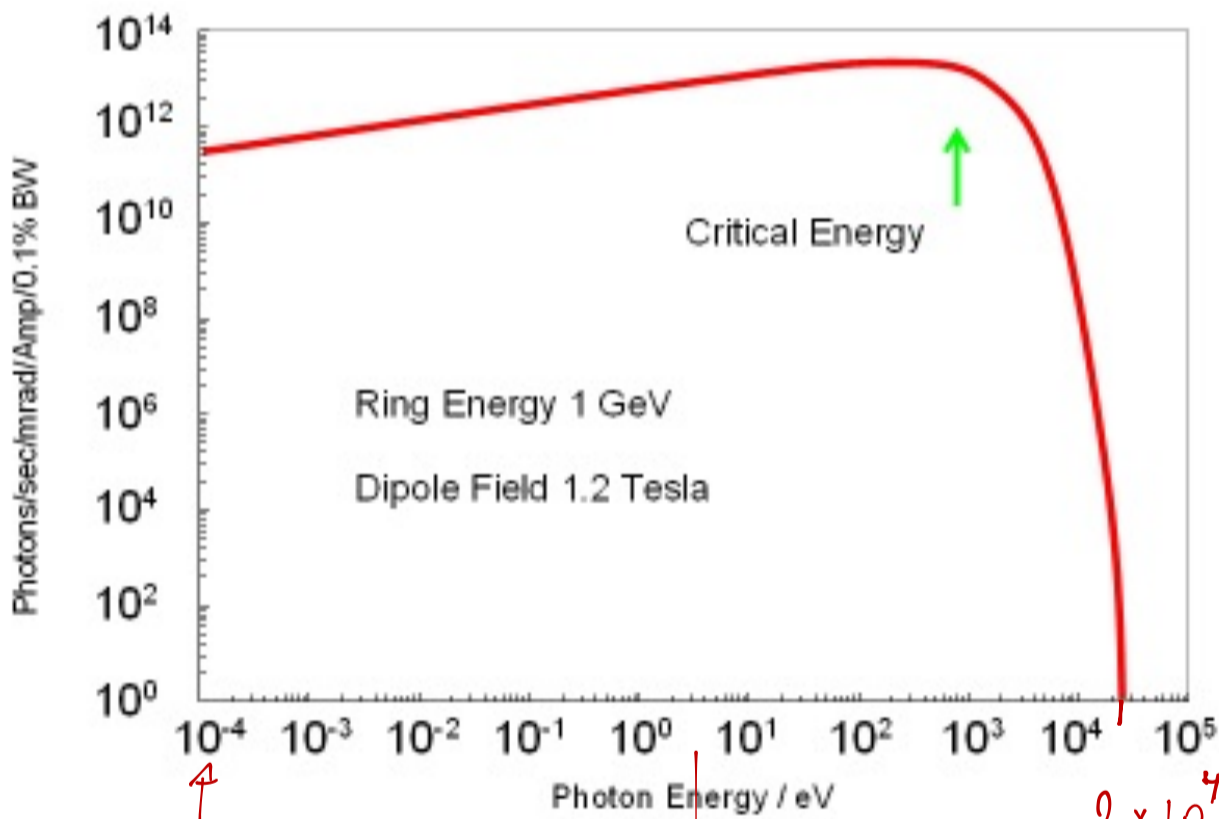
Radiogas λ mm ω po Negro

$$R(\nu, T) = \frac{2h\nu^3}{c^2} \left[\frac{1}{e^{\frac{h\nu}{k_B T}} - 1} \right]$$

↳ Radiação espectral $\left[\frac{J}{s \cdot m^2 \cdot mm \cdot sr} \right]$

Radiogãu Sem crotrom

Typical SR output curve



$10^{-4} eV$

$\lambda = 12 mm$

luz

$2 \cdot 10^4 eV$

$0,062 mm$