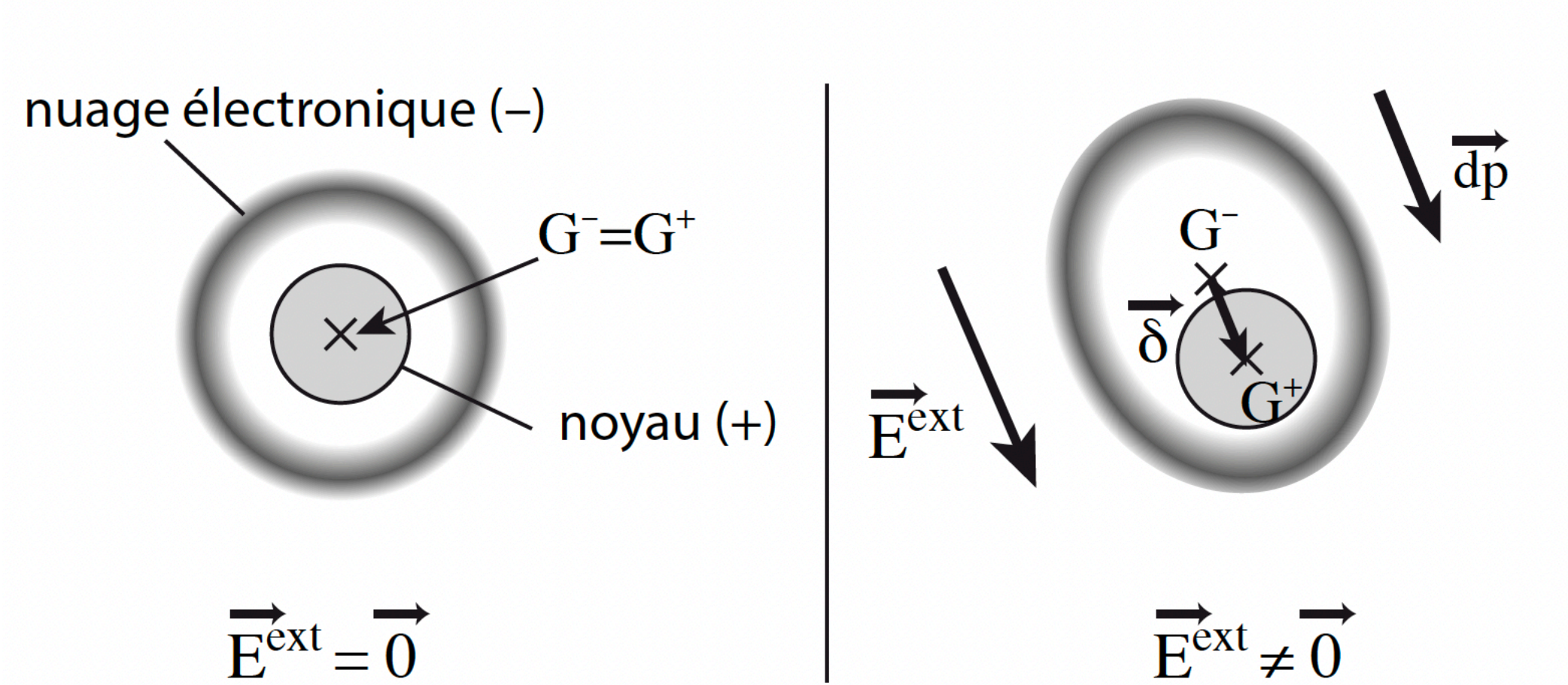
The atom is treated as an oscillating dipole driven by an external radiation field.



Permittivity

the response of a given medium to an applied electric field)

Units SI (MKSA) $\epsilon = \epsilon_0(1 + \chi_e)$

χ_e : Electric susceptibility (χ_e)

Units cgs $\epsilon = \epsilon_0(1 + 4\pi\chi_e)$

wavenumber : $k = \frac{2\pi}{\lambda}$

angular frequency $\omega = 2\pi\nu$

(describes how rapidly the phase of a wave changes with time, in rad/s)

$$k = \frac{n(\omega)\,\omega}{c}$$

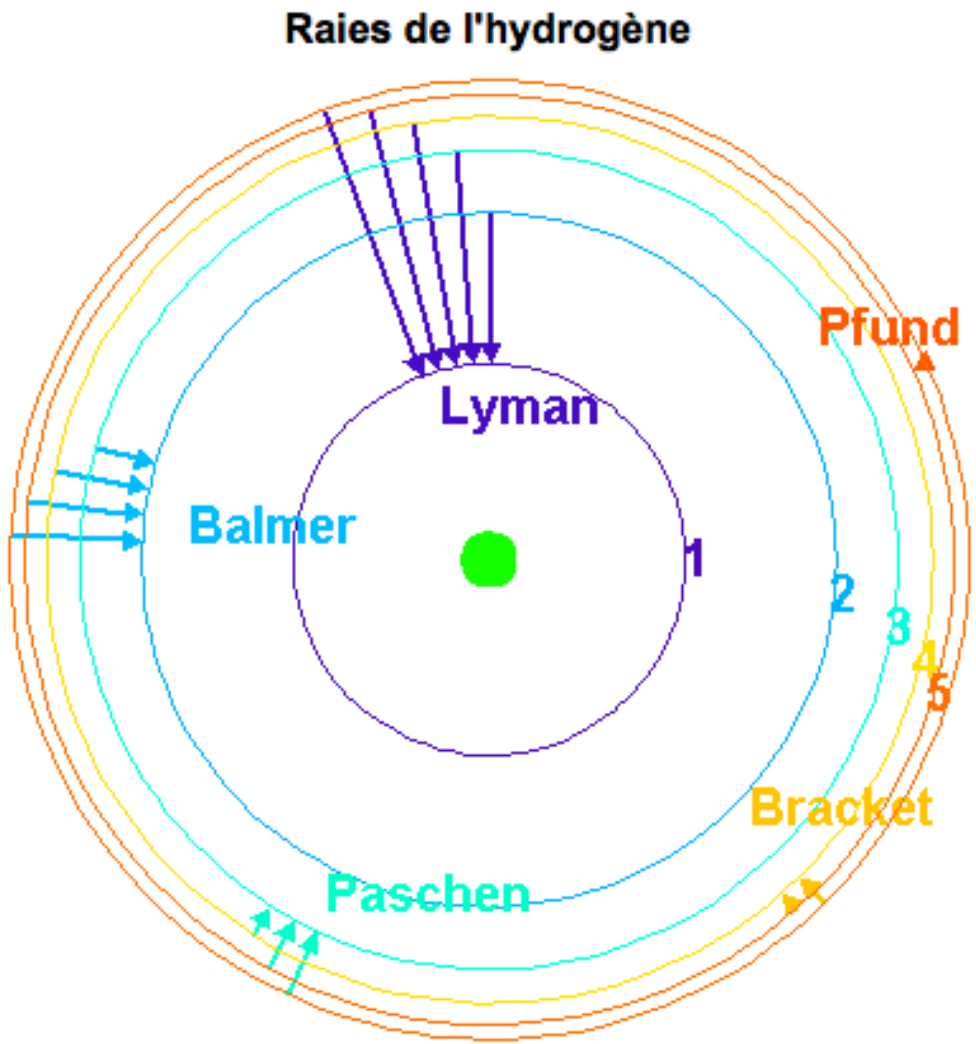
refraction absorption

$$n(\omega) = n(\omega) - i\,n'(\omega)$$

(refractive index ///. Sign - is a convention)

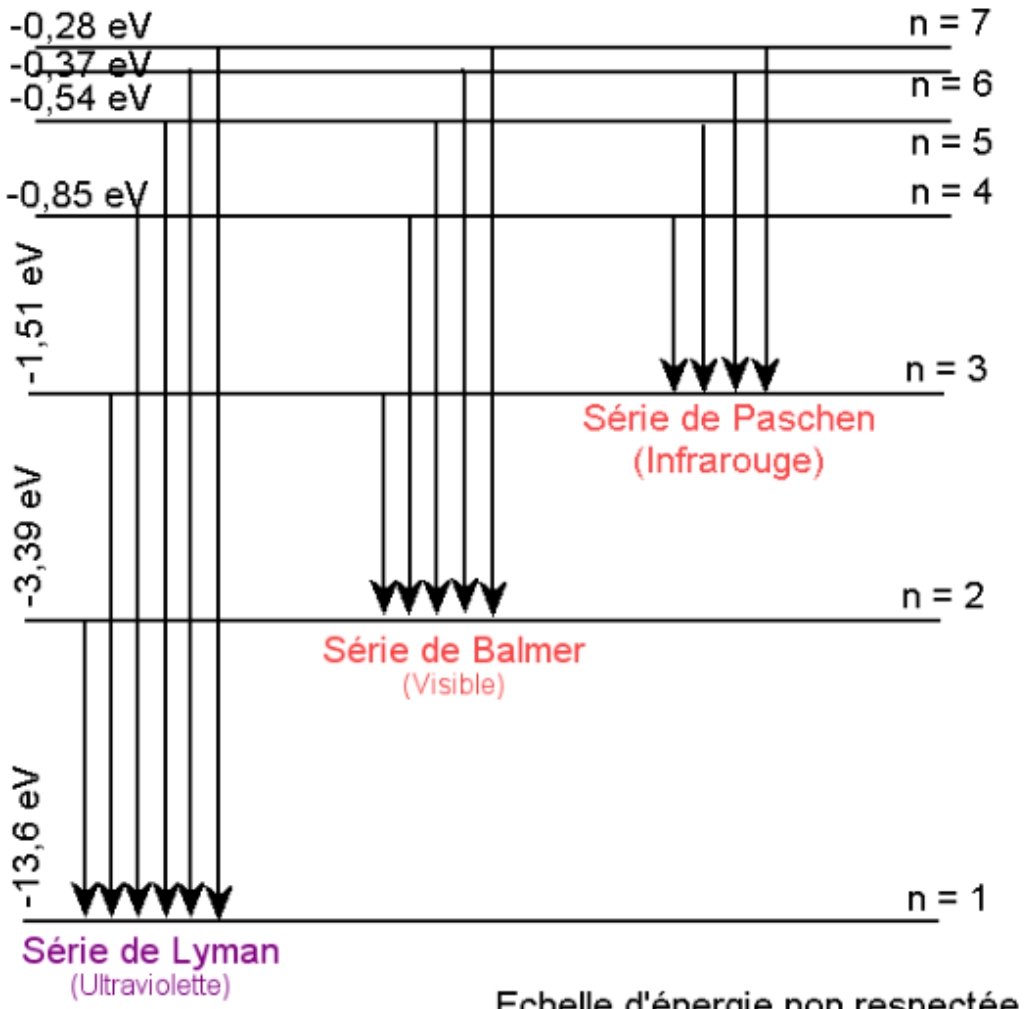
$n = \sqrt{\varepsilon_r}$:

- ε_0 = permittivity of free space ($8.854 \times 10^{-12}\ \mathrm{F/m}$) (farads per meter)
- $\varepsilon_r = \varepsilon/\varepsilon_0$ = **relative permittivity** (dimensionless)

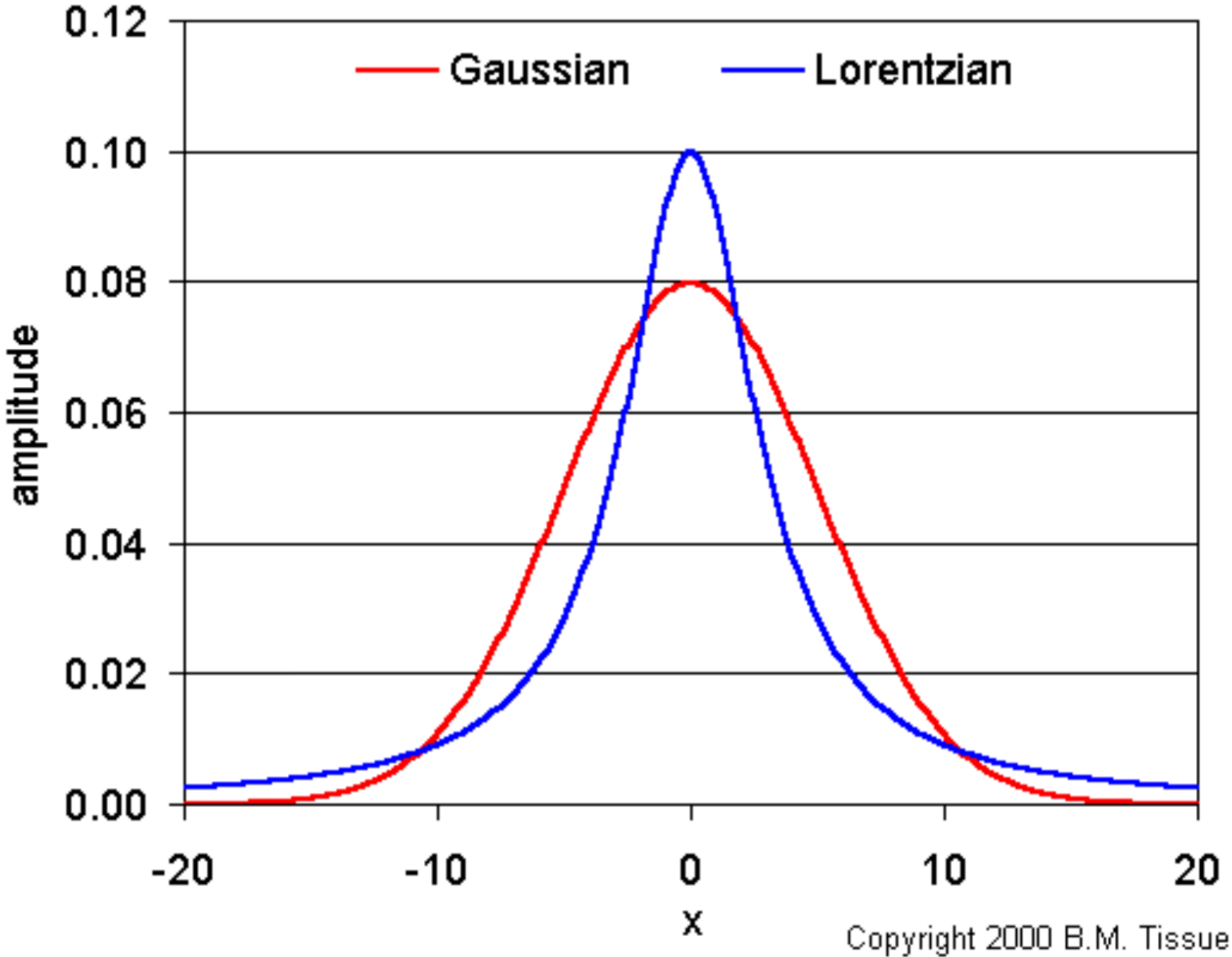


Familles spectrales de l'hydrogène, définies par le niveau d'énergie inférieur.

Crédit : ASM



Echelle d'énergie non respectée


0.12
0.10
0.08
0.06
0.04
0.02
0.00
amplitude
Gaussian
Lorentzian
-20
-10
0
10
20
x
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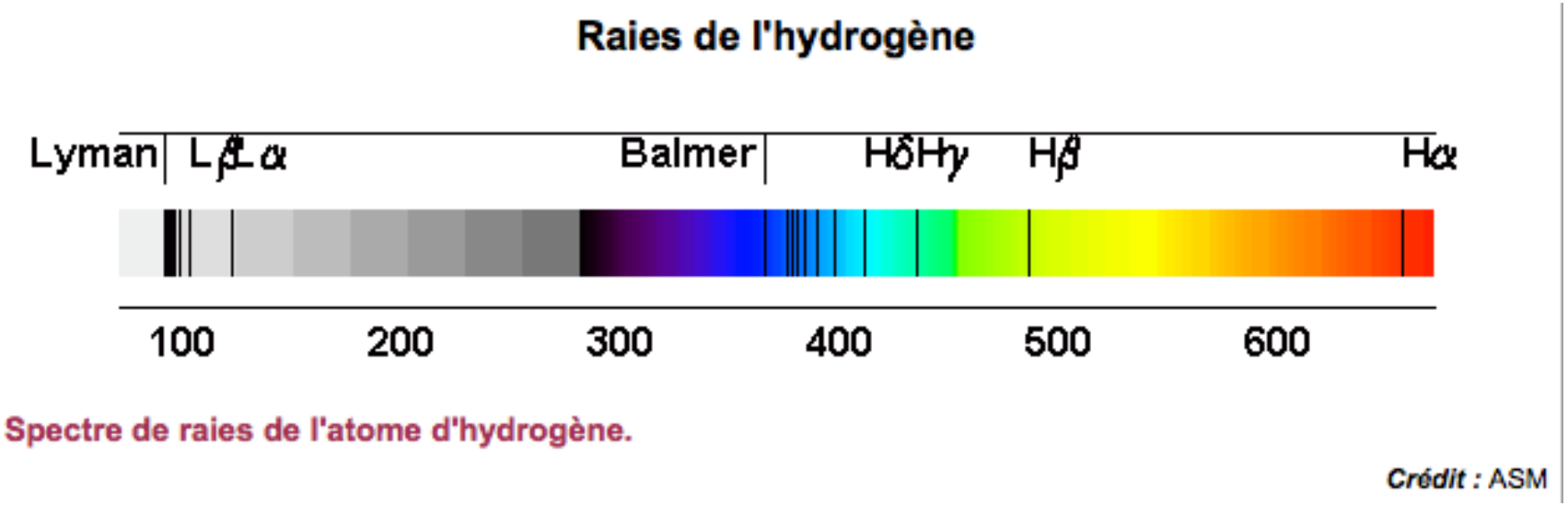
Hydrogen lines

$$E_n = \frac{-13,6\ eV}{n^2}$$

$$f_{nm} = \frac{2^6}{3\sqrt{3}\pi}\frac{1}{g_n}\frac{1}{\left(\frac{1}{n^2}-\frac{1}{m^2}\right)}\frac{1}{m^3}\frac{1}{n^3}\ g$$

où g est appelé facteur de Gaunt et est de l'ordre de l'unité et $g_n = 2\ n^2$ est l'ordre de dégénérescence du niveau n d'énergie E_n.



Spectre de raies de l'atome d'hydrogène.

Crédit : ASM