

FIGURA 4-9. Esquema de um aparelho usado para medir espectros atômicos.

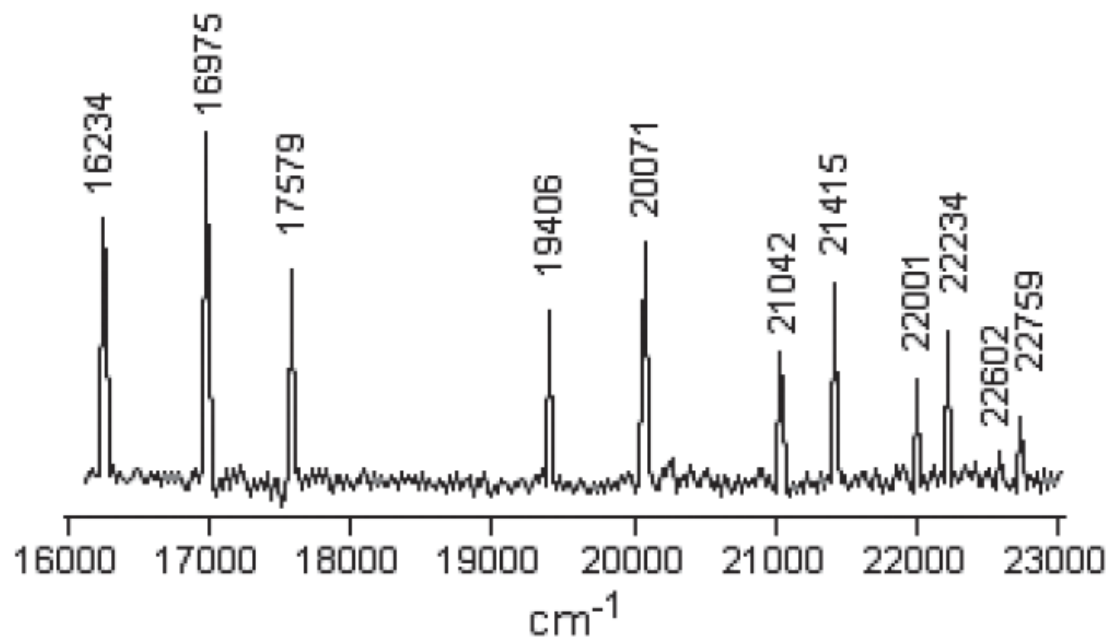
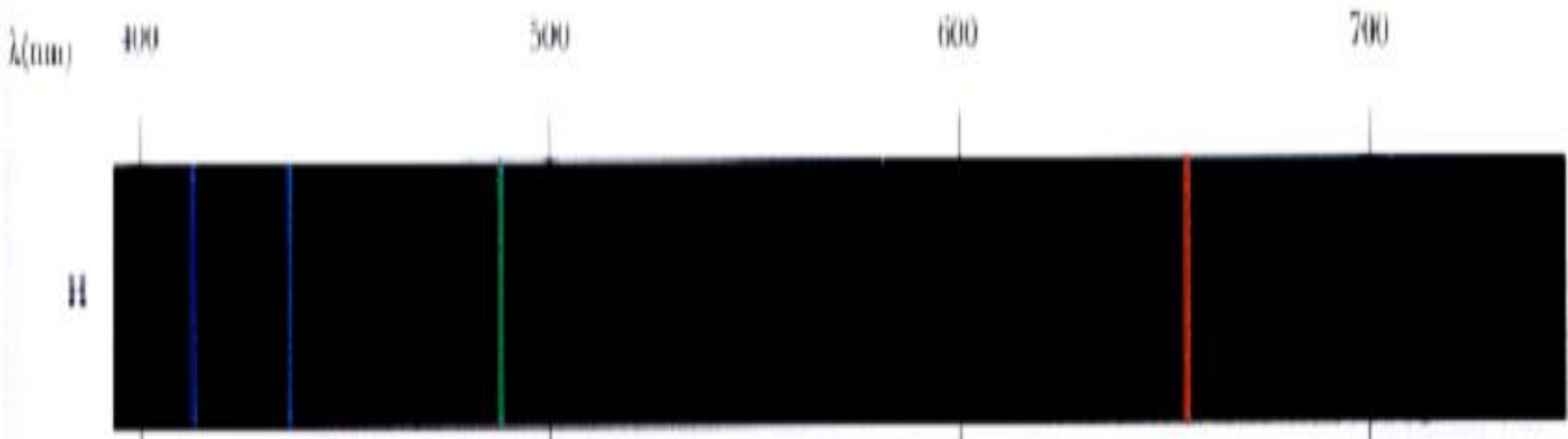
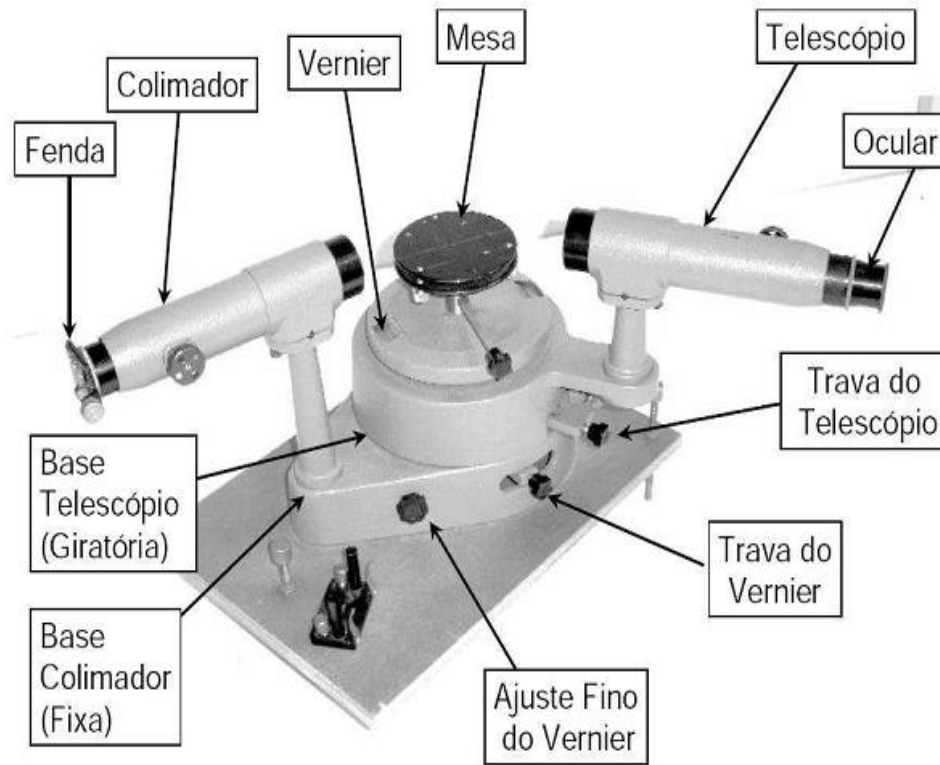


Figura 1. Espectro do sódio em baixa resolução. Foi utilizado um filtro de neodímio, para reduzir a intensidade da linha amarela (16975 cm⁻¹), que pode falsificar as intensidades relativas. A escala de intensidade é logarítmica, para compensar a grande variação de intensidade das linhas nas séries



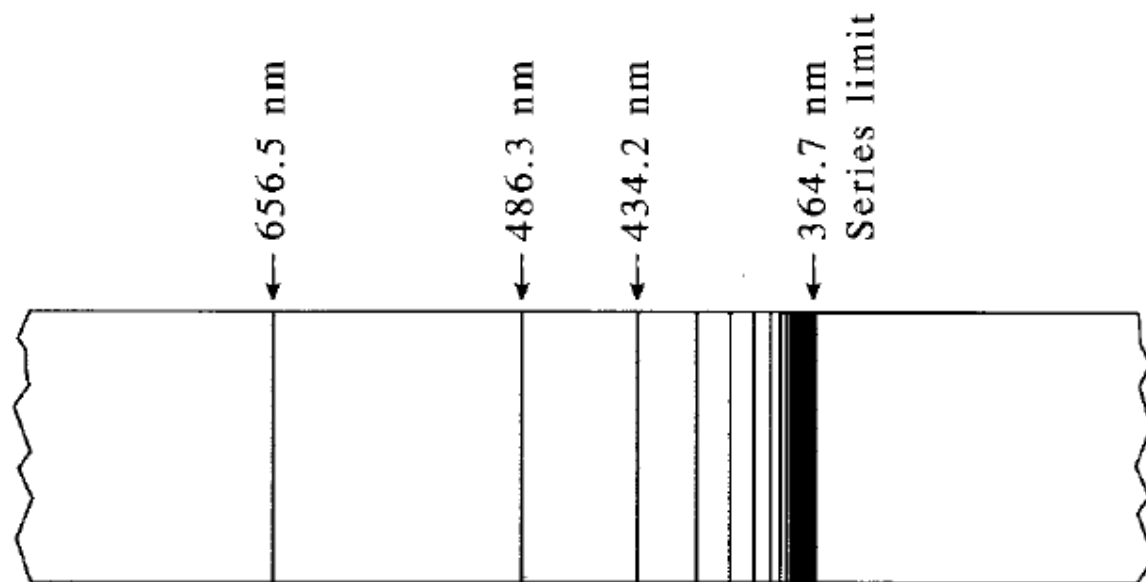


FIGURE 1.5

Emission spectrum of the hydrogen atom in the visible and the near ultraviolet region showing that the emission spectrum of atomic hydrogen is a line spectrum.

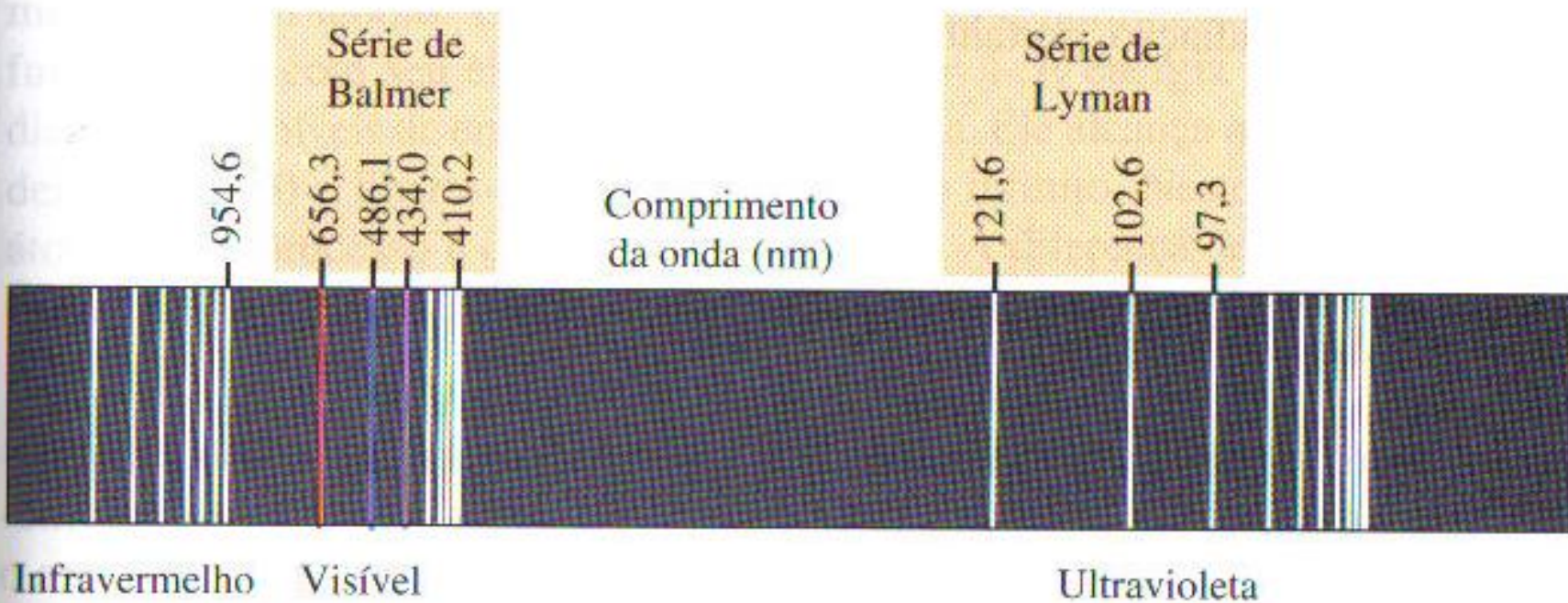


FIGURA 1.17 O espectro completo do átomo de hidrogênio. As linhas espectrais foram distribuídas em vários grupos chamados séries, duas das quais são mostradas com seus nomes.

Energy

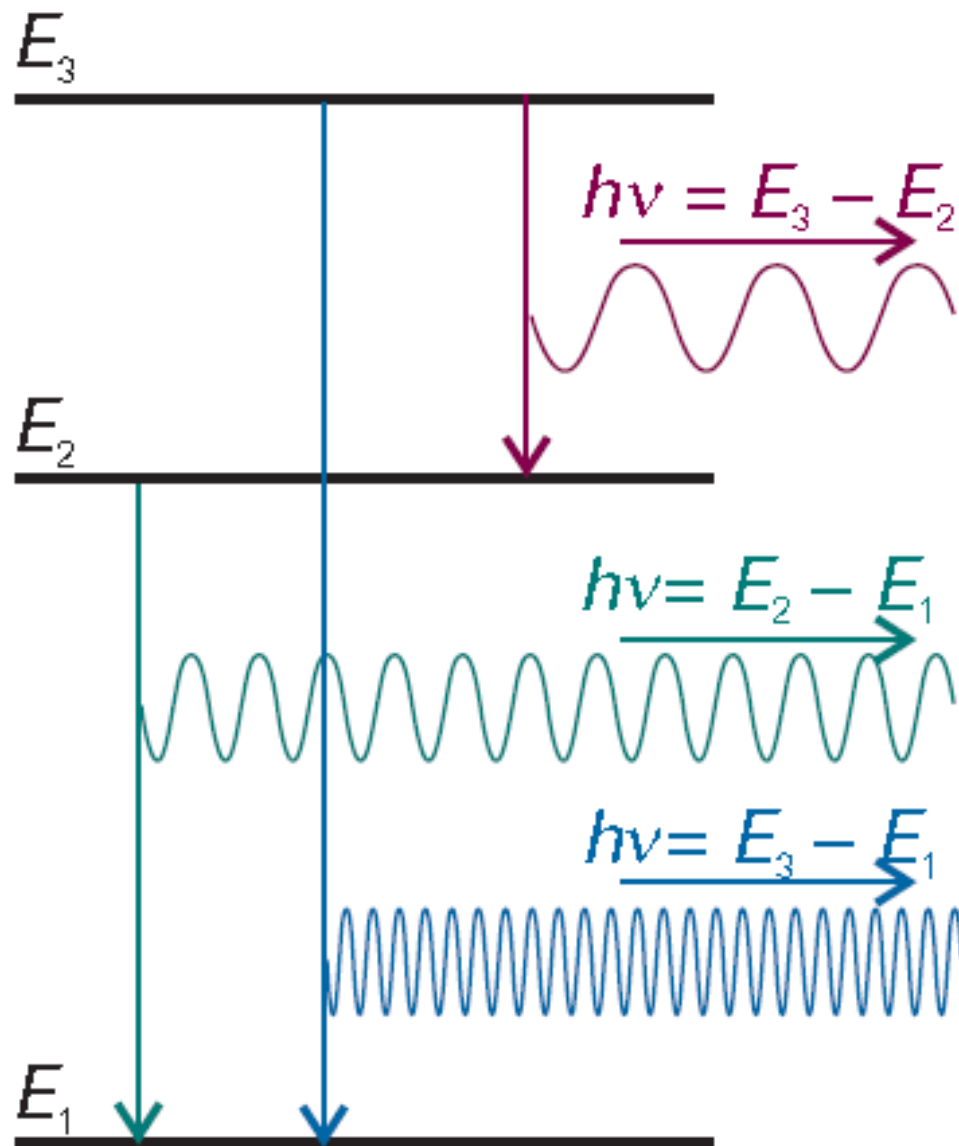




Figura 1. Esquema do espectro de hidrogênio mostrando as seis primeiras linhas da série de Balmer, estando indicado na parte superior o número de onda (cm^{-1}) e na parte inferior o comprimento de onda (nm)

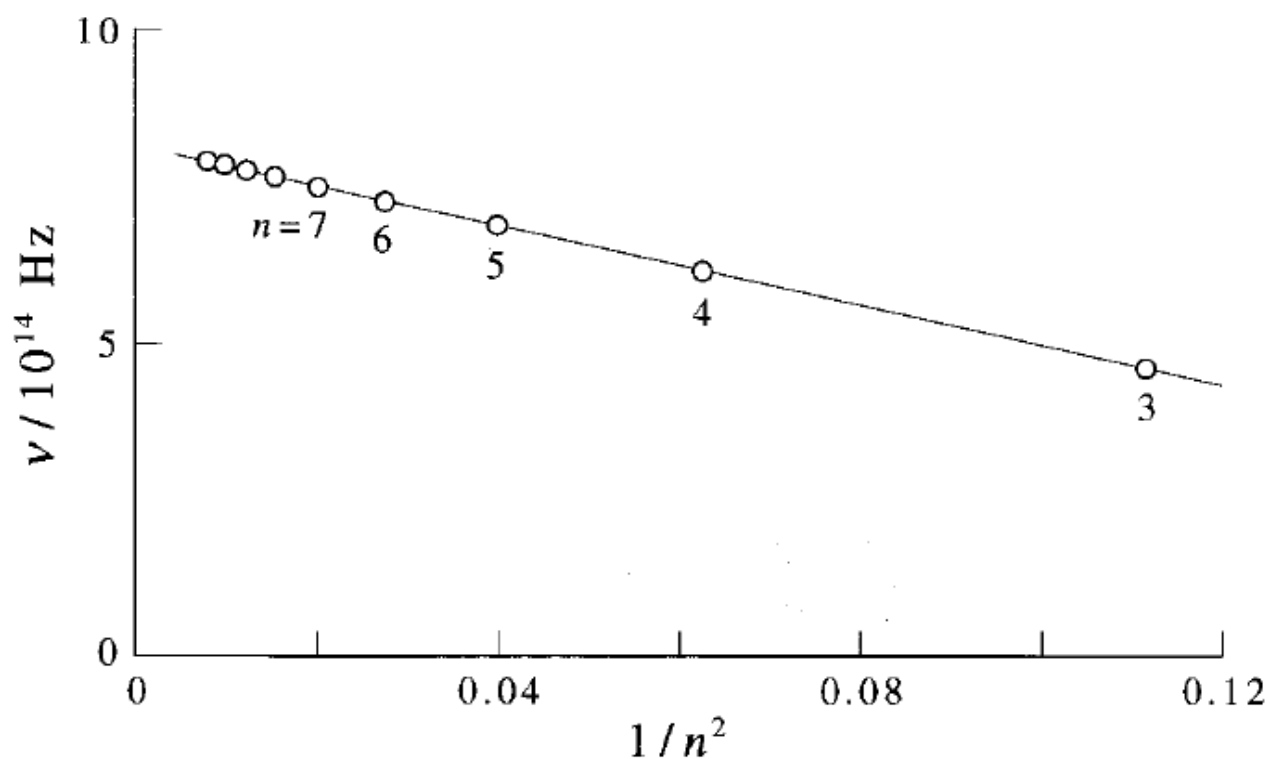


FIGURE 1.6

A plot of frequency versus $1/n^2$ ($n = 3, 4, 5, \dots$) for the series of lines of the hydrogen atom spectrum that occurs in the visible and near ultraviolet regions. The actual spectrum is shown in Figure 1.5. The linear nature of this plot leads directly to Equation 1.9.

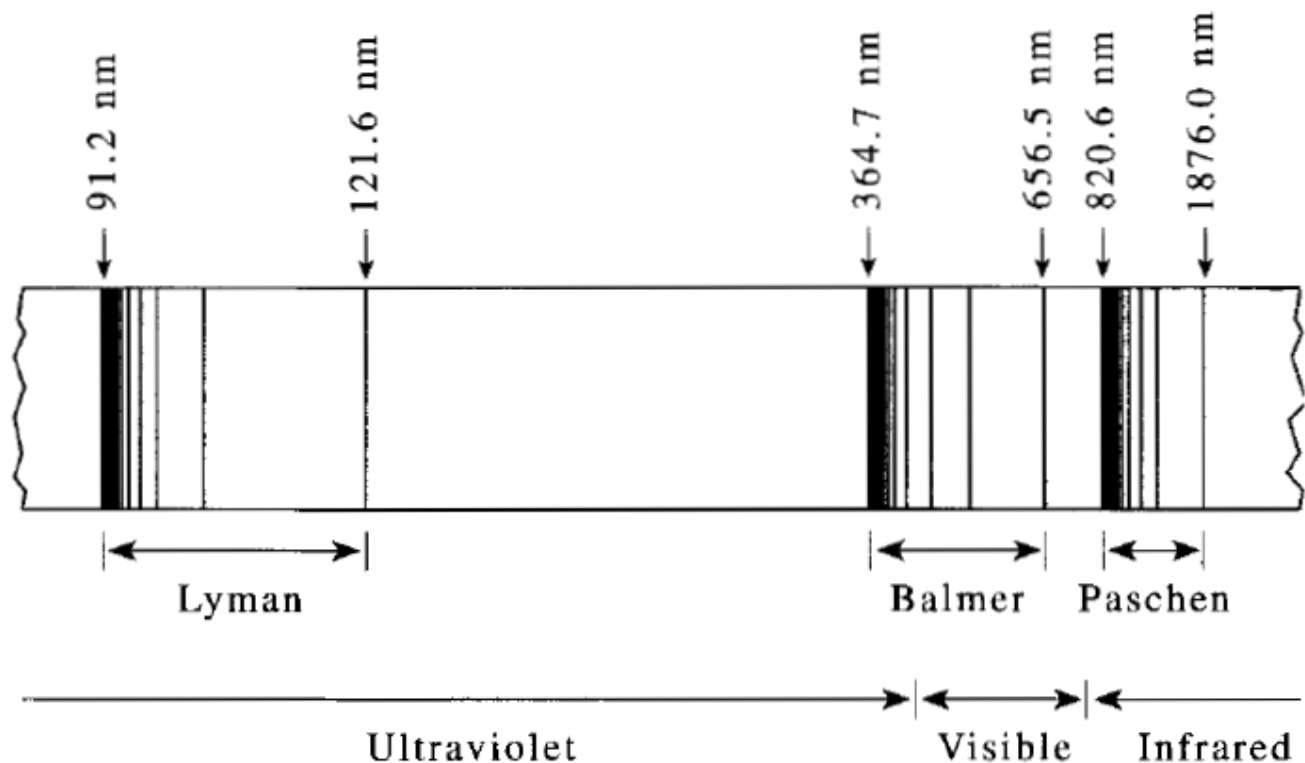


FIGURE 1.7

A schematic representation of the various series in the hydrogen atomic spectrum. The Lyman series lies in the ultraviolet region; the Balmer lies in the visible region; and the Paschen and Brackett series lie in the infrared region (see Table 1.1).

$$\tilde{\nu} = R_H \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right) \quad R_H = 109\,677 \text{ cm}^{-1}$$

constante de Rydberg

TABLE 1.1

The first four series of lines making up the hydrogen atomic spectrum. The term “near infrared” denotes the part of the infrared region of the spectrum that is near the visible region.

Series name	n_1	n_2	Region of spectrum
Lyman	1	2, 3, 4, ...	Ultraviolet
Balmer	2	3, 4, 5, ...	Visible
Paschen	3	4, 5, 6, ...	Near infrared
Bracket	4	5, 6, 7, ...	Infrared

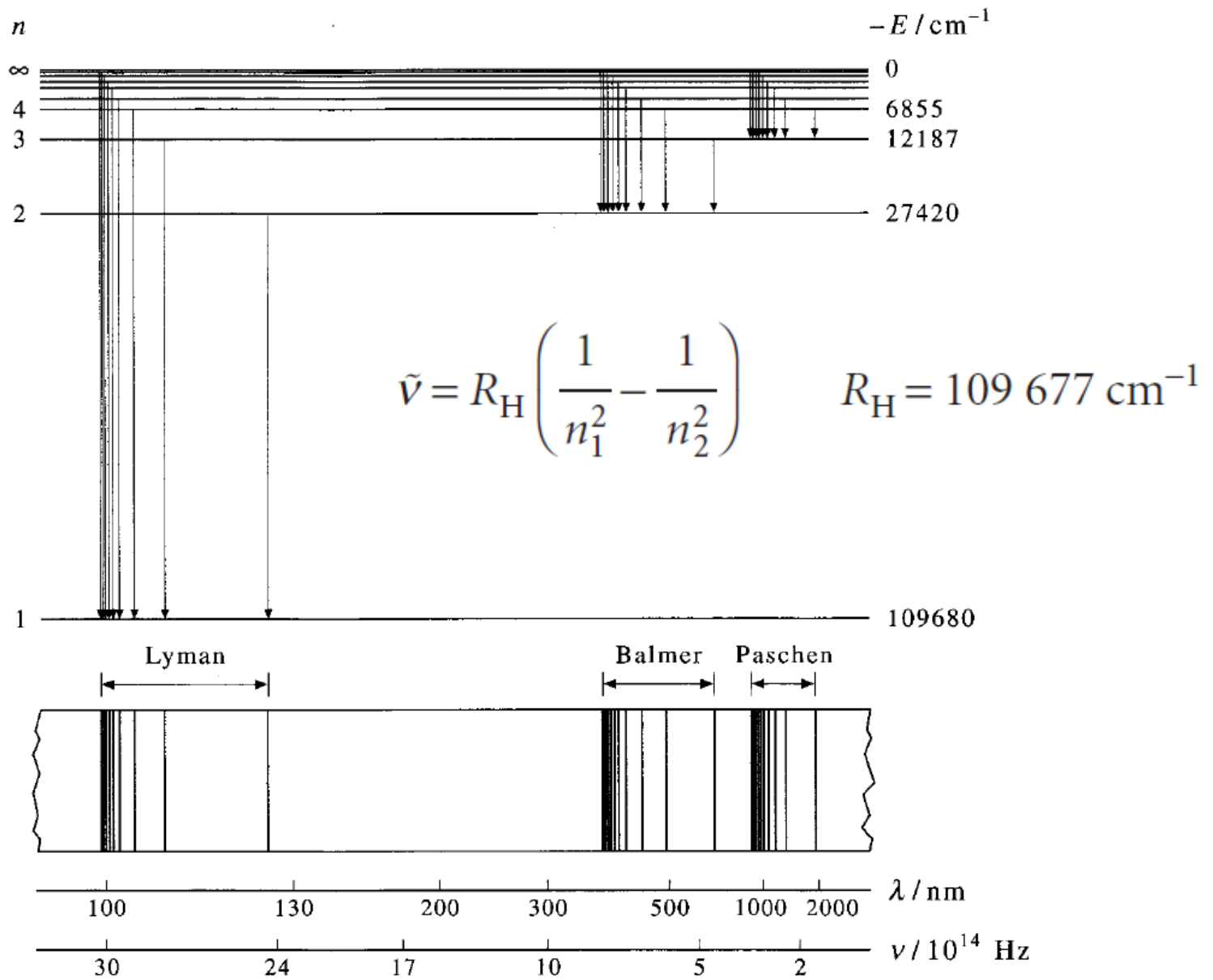


FIGURE 1.10

The energy-level diagram for the hydrogen atom, showing how transitions from higher states into some particular state lead to the observed spectral series for hydrogen.

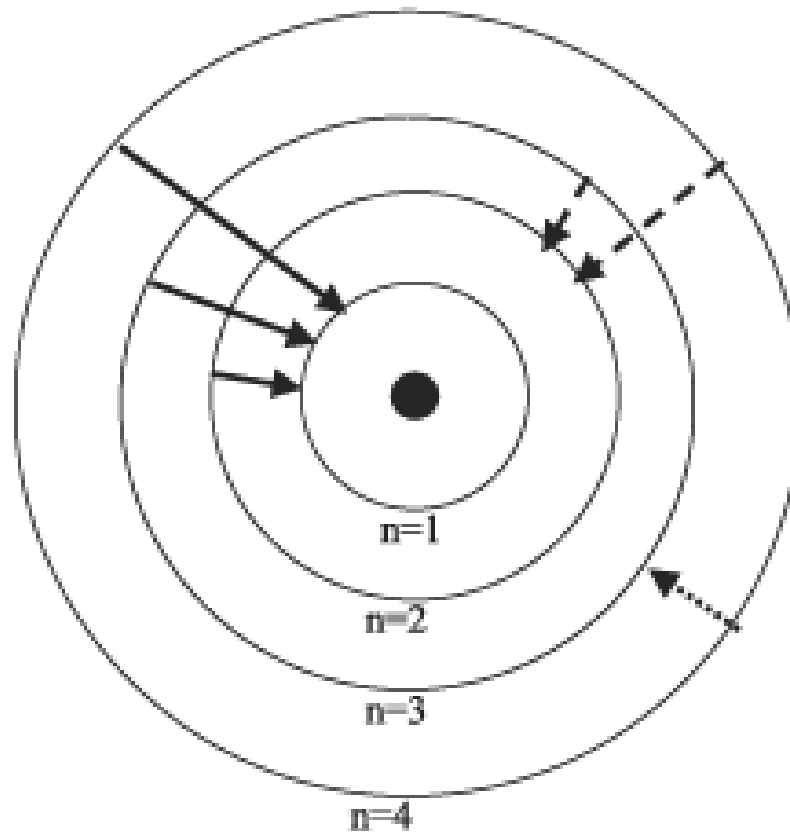
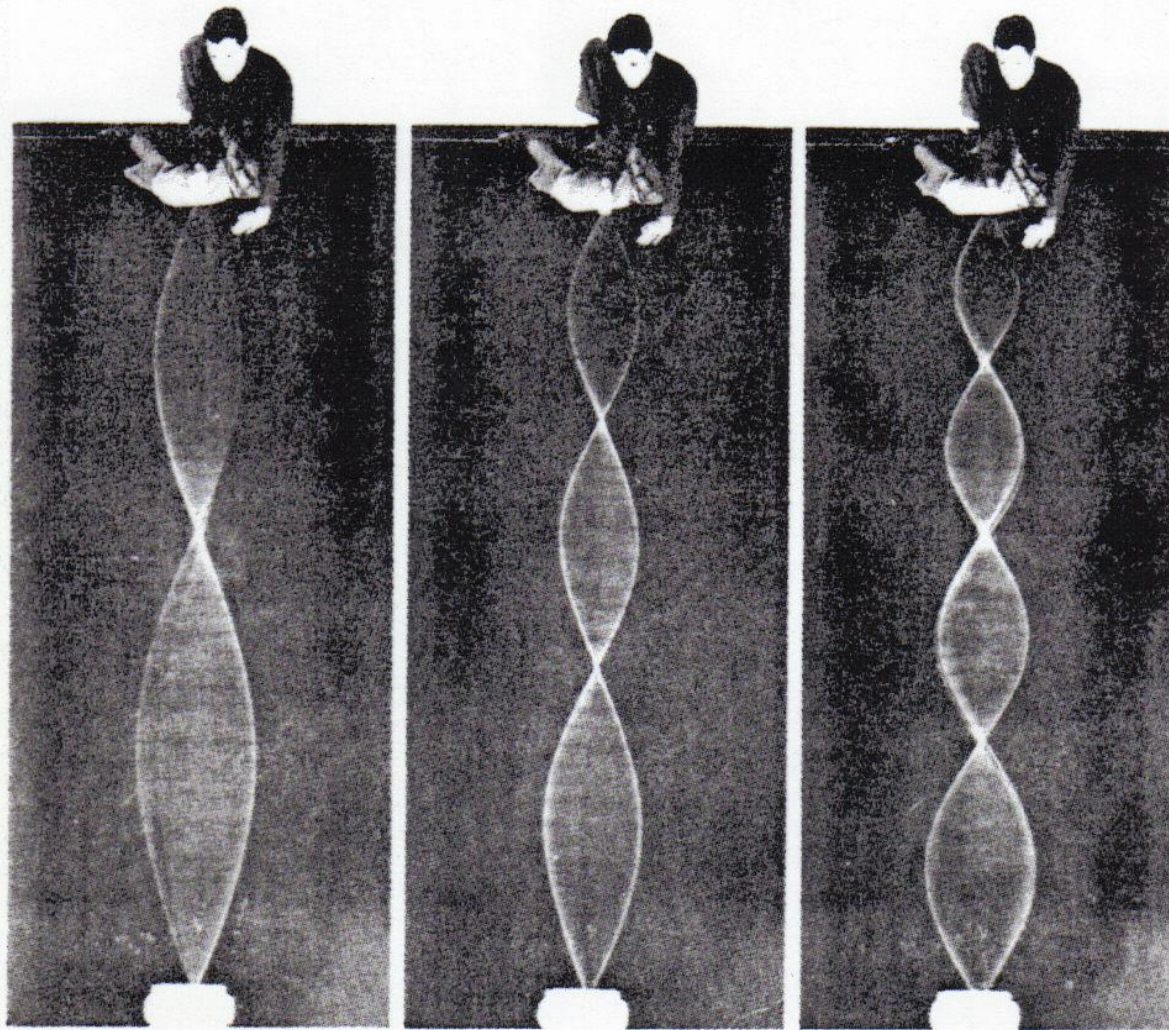
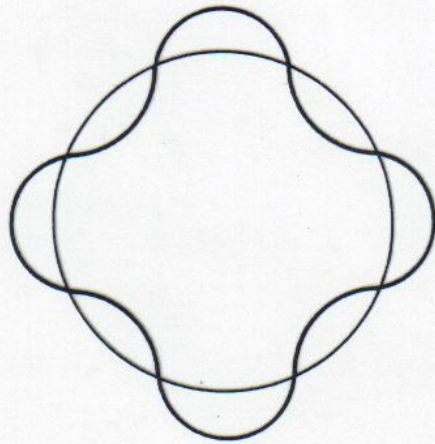


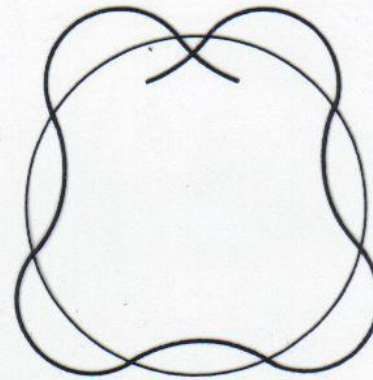
Figura 2. Órbitas circulares com numeração arbitrária a partir de 1 para a mais interna; são indicadas algumas transições possíveis para determinadas órbitas fixadas



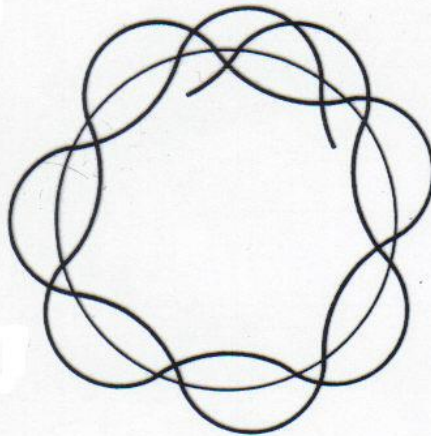
Standing waves can be set up in a string by shaking one end of the string at the correct frequency.



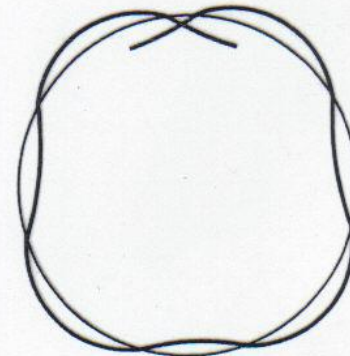
(a)



(b)



(c)



(d)

An illustration of matching and mismatching de Broglie waves traveling in Bohr orbits. If the wavelengths of the de Broglie waves are such that an integral number of them fit around the circle, then they match after a complete revolution (a). If a wave does not match after a complete revolution, cancellation will result and the wave will progressively disappear (b-d).