

The following table is from “Note on the spectral lines of hydrogen” by J. J. Balmer dated 1885. Numerical values are hydrogen line wavelengths in units of 10^{-10} meter.

	H_α	H_β	H_γ	H_δ	H_ϵ	H_ζ	H_η	H_ϑ	H_ι
Van der Willigen	6565.6	4863.94	4342.80	4103.8	—	—	—	—	—
Angstrom	6562.10	4860.74	4340.10	4101.2	—	—	—	—	—
Mendenhall	6561.62	4860.16	—	—	—	—	—	—	—
Mascart	6560.7	4859.8	—	—	—	—	—	—	—
Ditscheiner	6559.5	4859.74	4338.60	4100.0	—	—	—	—	—
Huggins	—	—	—	—	—	3887.5	3834	3795	3767.5
Vogel	—	—	—	—	3969	3887	3834	3795	3769 [†]

([†]The value given in the paper is 6769 which is an obvious typo.)

Using the above data, Balmer found the following formula for wavelength \hat{y} .

$$\hat{y} = \frac{m^2}{m^2 - 2^2} \times 3645.6 \times 10^{-10} \text{ meter}$$

where m is determined by the hydrogen line according to the following table.

$$m = \begin{matrix} & H_\alpha & H_\beta & H_\gamma & H_\delta & H_\epsilon & H_\zeta & H_\eta & H_\vartheta & H_\iota \\ & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \end{matrix}$$

The modern value of the model coefficient is

$$\frac{4}{R_H} = 3647.05 \times 10^{-10} \text{ meter}$$

where

$$R_H = 1.09677576 \times 10^7 \text{ meter}^{-1}$$