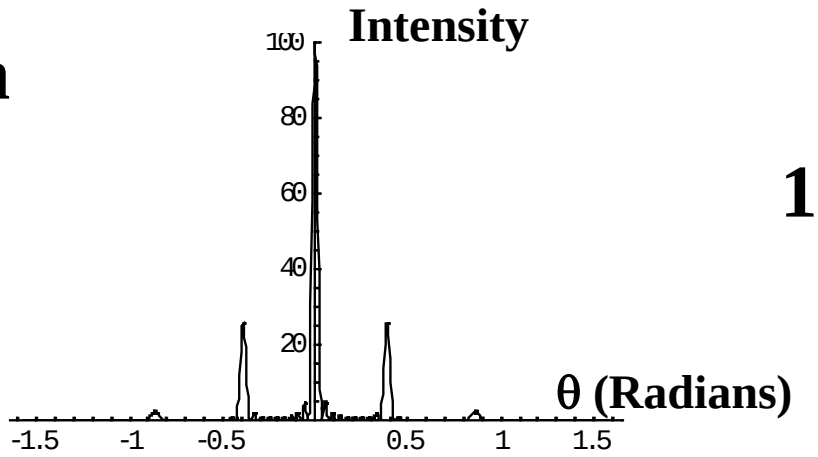
# N-Slit Diffraction

$N \rightarrow \infty$

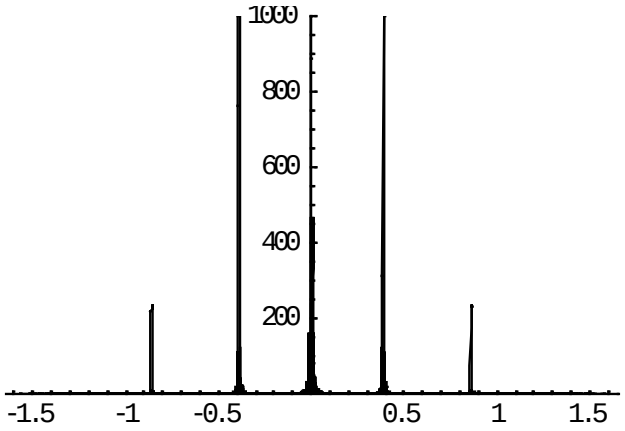
**Slit Dimensions:**

**a=1 μm**

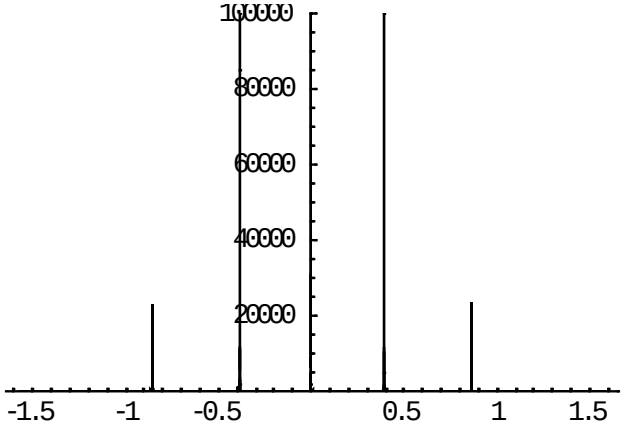
**d=1.67 μm**



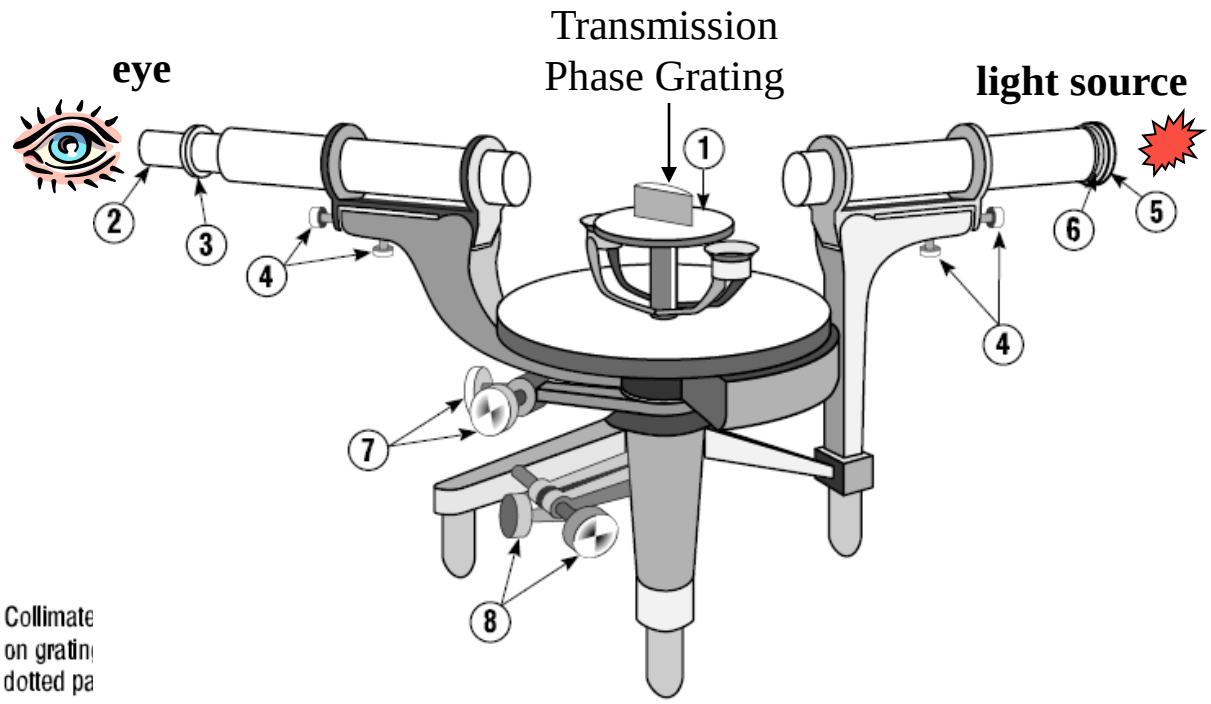

**10 Slits**

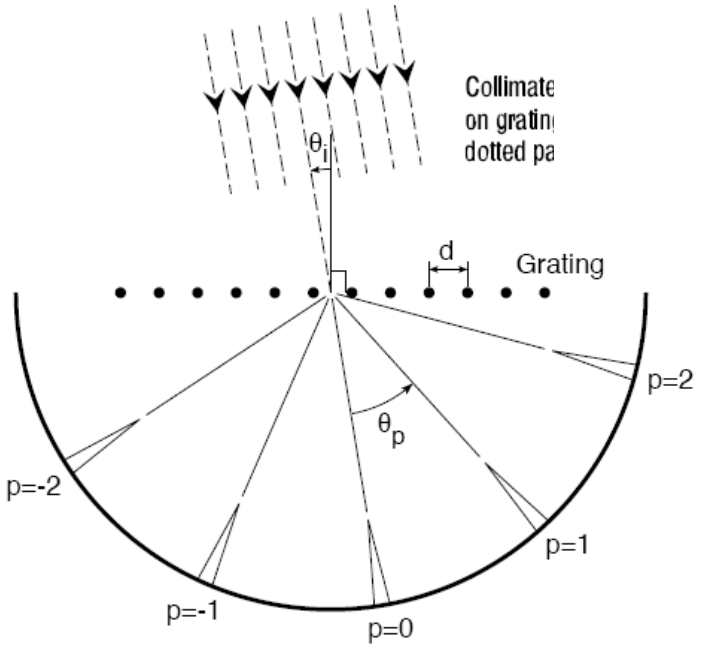



**100 Slits**



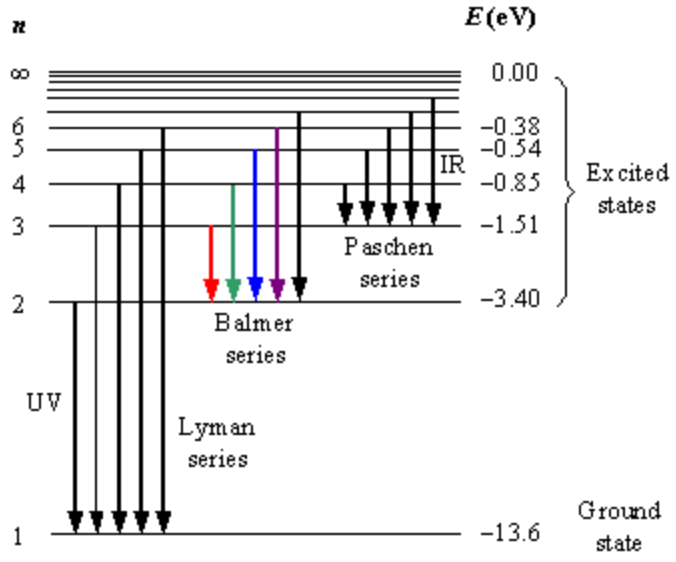

**1000 Slits**



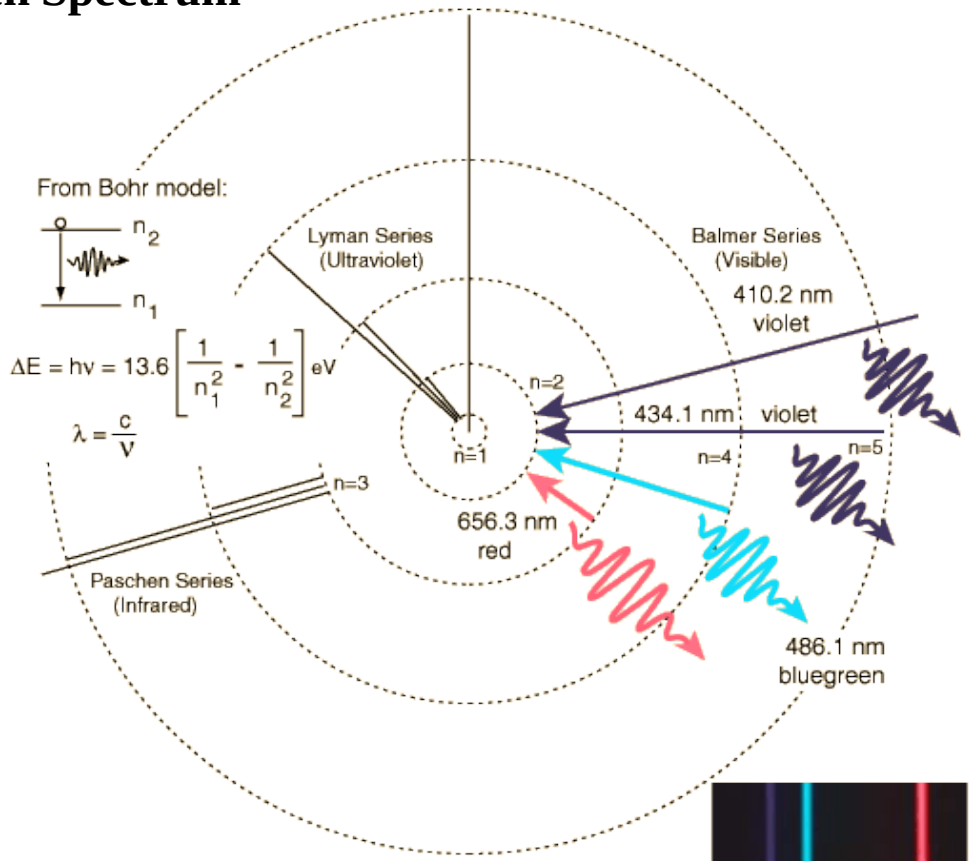




$$p\lambda = d\left(\sin\theta_p + \sin\theta_i\right), \qquad p = \pm 1, \pm 2, \pm 3, \ldots$$

# Hydrogen Spectrum



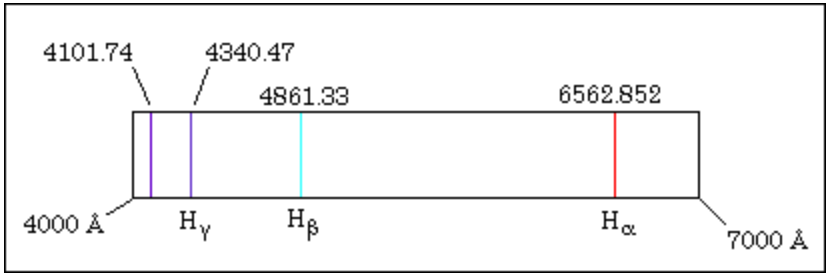

Energy levels of the hydrogen atom with some of the transitions between them that give rise to the spectral lines indicated.

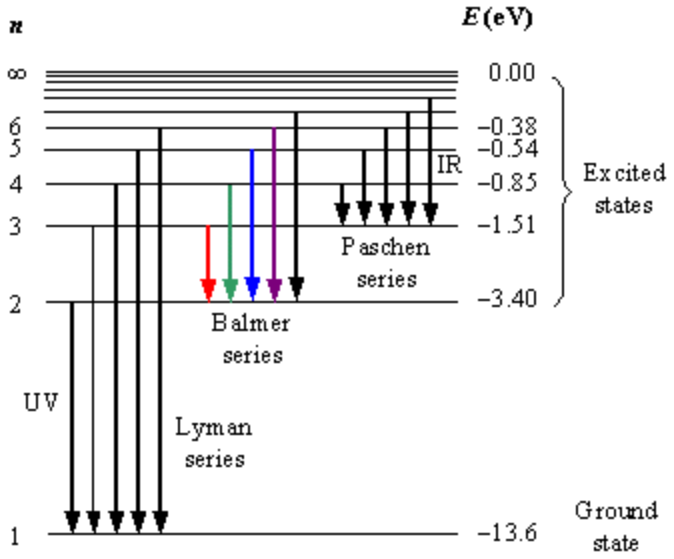




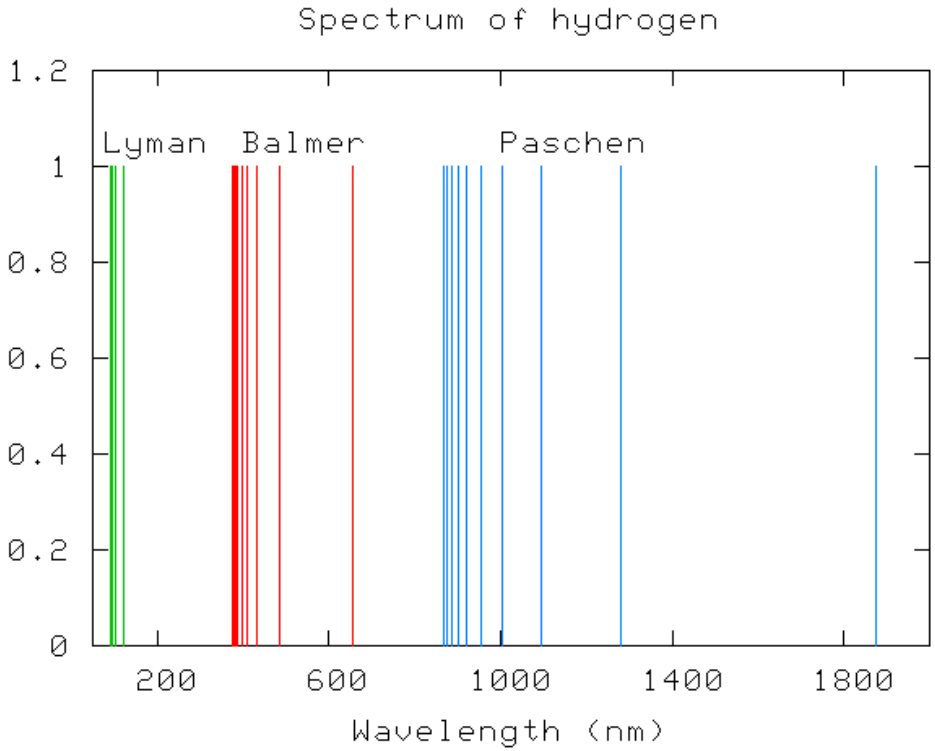

The measured lines of the Balmer series of hydrogen in the nominal visible region are:

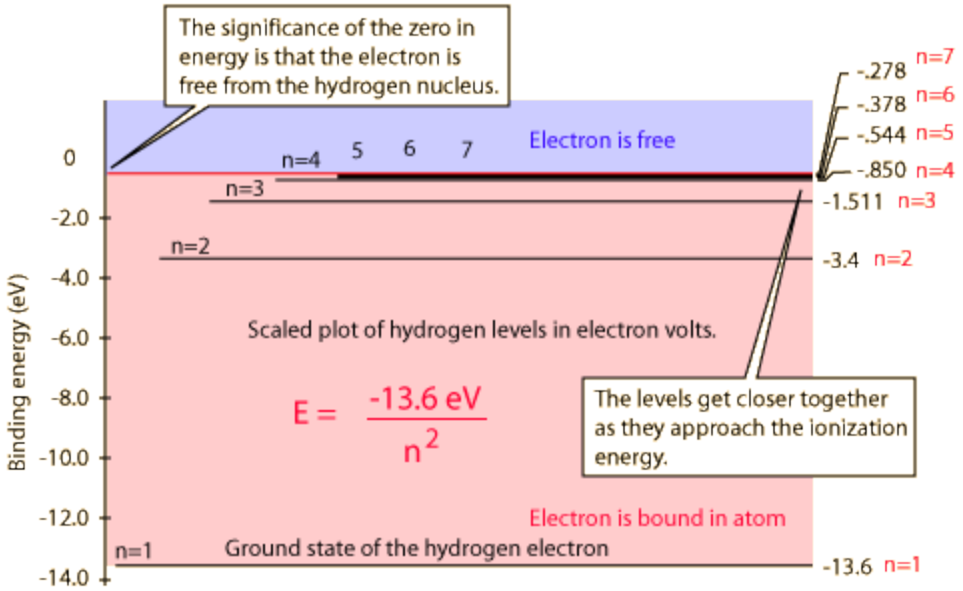
| Wavelength (nm) | Relative Intensity | Transition | Color |
|---|---|---|---|
| 383.5384 | 5 | 9 -> 2 | Violet |
| 388.9049 | 6 | 8 -> 2 | Violet |
| 397.0072 | 8 | 7 -> 2 | Violet |
| 410.174 | 15 | 6 -> 2 | Violet |
| 434.047 | 30 | 5 -> 2 | Violet |
| 486.133 | 80 | 4 -> 2 | Bluegreen (cyan) |
| 656.272 | 120 | 3 -> 2 | Red |
| 656.2852 | 180 | 3 -> 2 | Red |



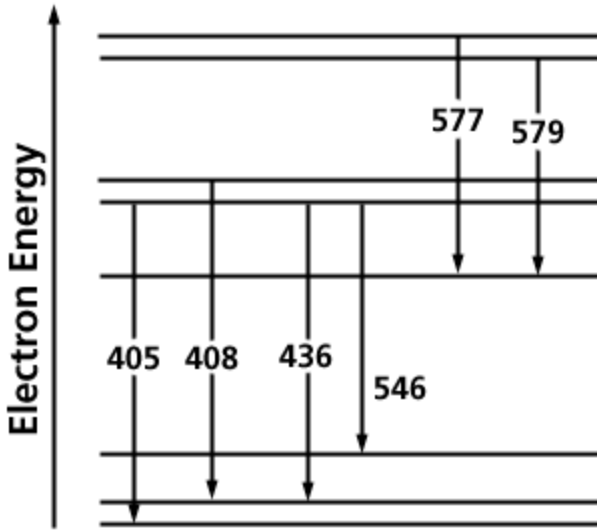



Energy levels of the hydrogen atom with some of the transitions between them that give rise to the spectral lines indicated.



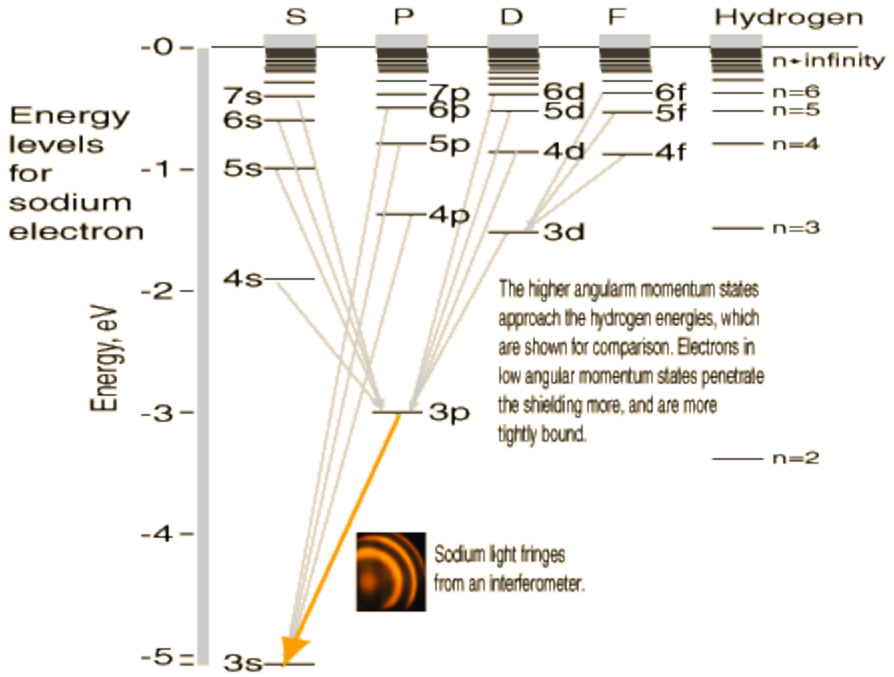
## Mercury




The measured lines of Mercury in the nominal visible region are:

| Wavelength (nm) | Relative Intensity | Color |
|---|---|---|
| 614.95 | weak | Red |
| 579.07 | strong | Yellow |
| 576.96 | strong | Yellow |
| 546.07 | strong | Green |
| 435.84 | very strong | Blue |
| 434.75 | strong | |
| 433.92 | medium | |
| 407.78 | strong | Violet |
| 404.66 | very strong | |

## Sodium




## Sodium Doublet