Task1

April 4, 2021

0.0.1 ION IDENTIFICATION

0.0.2 A:To identify the atoms responsible for the features A to H with their Ionic State

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# Given Image
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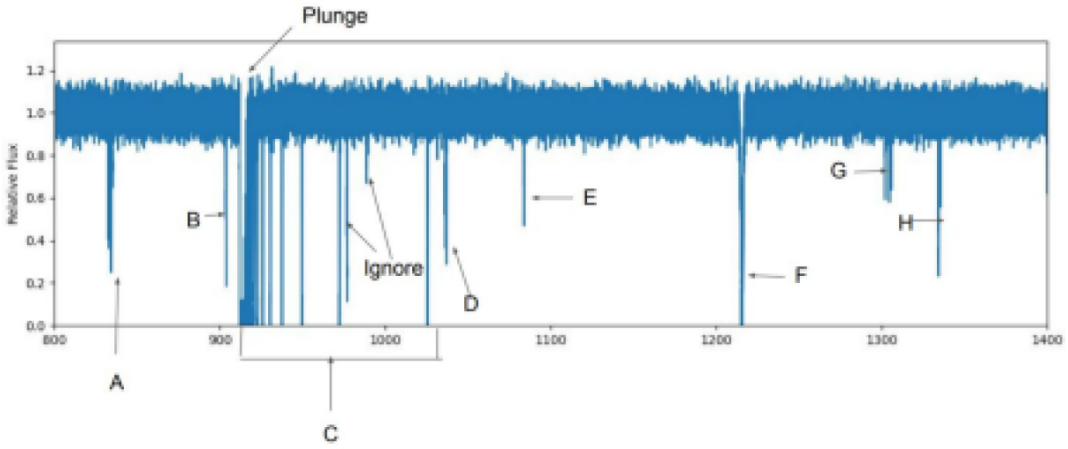
[5]:
```
from IPython.display import Image
Image(filename="/content/drive/MyDrive/Temp/gsoc.png")
```

[5]:



The values for observed transitions for Hydrogen can be found on the NIST website, and we can look up the values for the other elements from the same website as well. With this information, we can identify the atoms responsible for each feature.

The name of the element is given using the standard chemical symbol from the periodic table (e.g., H=hydrogen, N=nitrogen,O=Oxygen etc.). The ionization state of the element is indicated by a **Roman numeral suffix in the following way: neutral=I, singly ionized=II, doubly ionized=III (i.e. ionization state = Roman numeral -1)**. For example, O III means doubly ionized oxygen, O+2.

Feature Element Wavelength A . Oxygen(II) approx wavelength of 833 Angstroms B . Carbon(II) approx wavelength of 903 Angstroms C . Hydrogen(I) approx wavelength of 911 Angstroms D . Oxygen(I) approx wavelength of 1039 Angstroms E . Nitrogen(II) approx wavelength of 1085 Angstroms F . Hydrogen(I) approx wavelength of 1215 Angstroms G . Oxygen(I) approx wavelength of 1306 Angstroms H . Carbon(I) approx wavelength of 1329 Angstroms

0.0.3 B.How are the lines in feature C related?And what causes the plunge near 900 Angstroms?

The lines in feature C belong to the Hydrogen spectrum belonging to the Lyman Series(911Angstrom to 1215Angstrom)

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# Lyman Series
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[6]:
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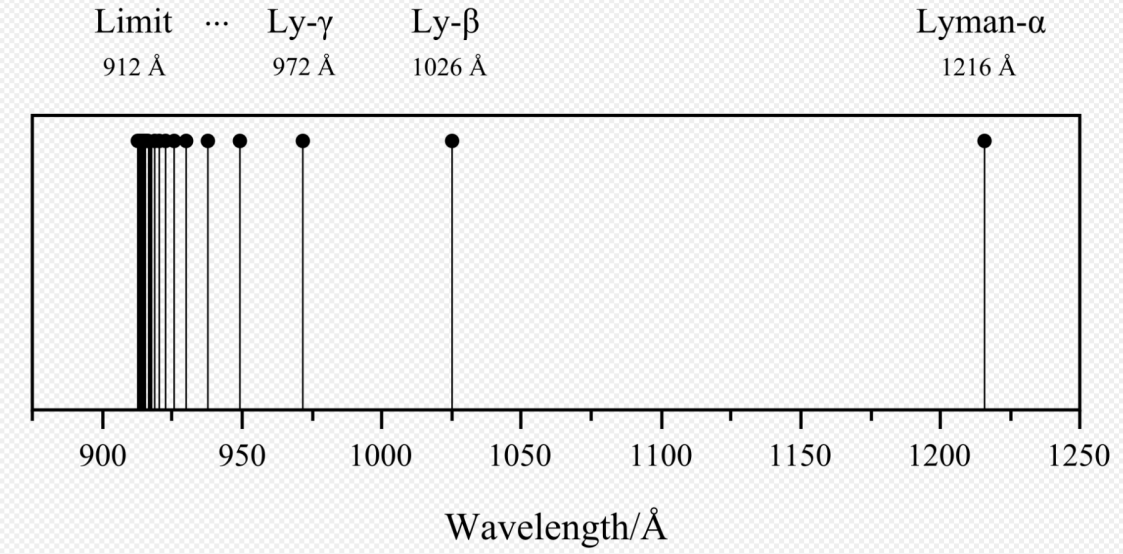
[6]:



The plunge near 900 Angstrom is caused because the radiations approach the limit of Lyman series for Hydrogen. As n approaches infinity the spectral lines end up appearing to converge at this wavelength(911 Angstrom Lyman Limit) which causes radiations in these frequencies to be absorbed by the gas.Since it is being absorbed, a plunge can be seen in the graph.

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# Rhydhberg's Equation
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[7]:
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[7]:

The version of the Rydberg formula that generated the Lyman series was:[2]

$$\frac{1}{\lambda} = R_{\mathrm{H}}\left(1 - \frac{1}{n^2}\right) \qquad \left(R_{\mathrm{H}} \approx 1.0968\times10^{7}\ \mathrm{m}^{-1} \approx \frac{13.6\,\mathrm{eV}}{hc}\right)$$

Where n is a natural number greater than or equal to 2 (i.e., n = 2, 3, 4, ...).

italicised text