Intro to Quantum Physics F3241

Dr Lily Asquith (Lily)

Week 6

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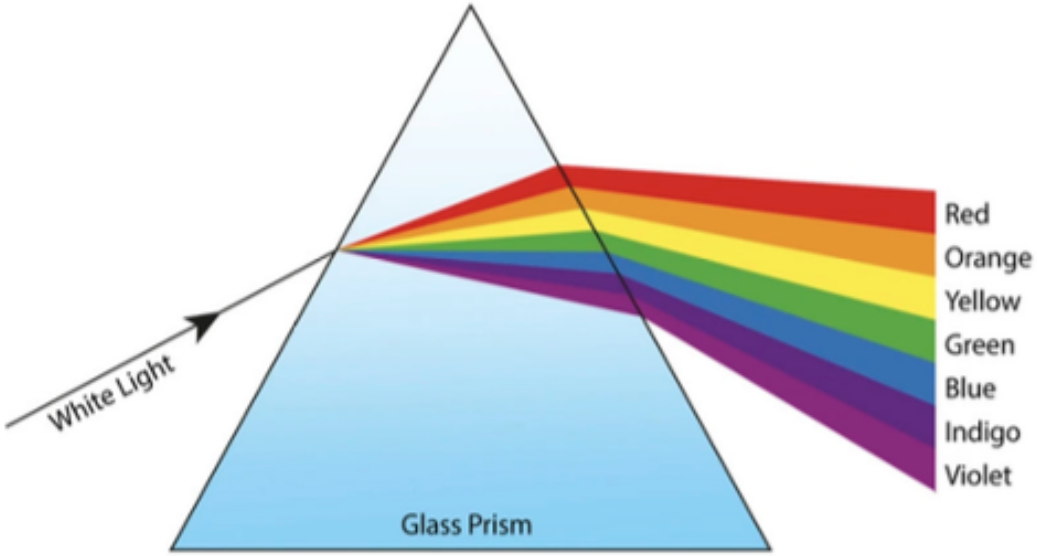
The continuous EM spectrum

Sunlight appears white-ish to us. We can spread it out using dispersion or diffraction.



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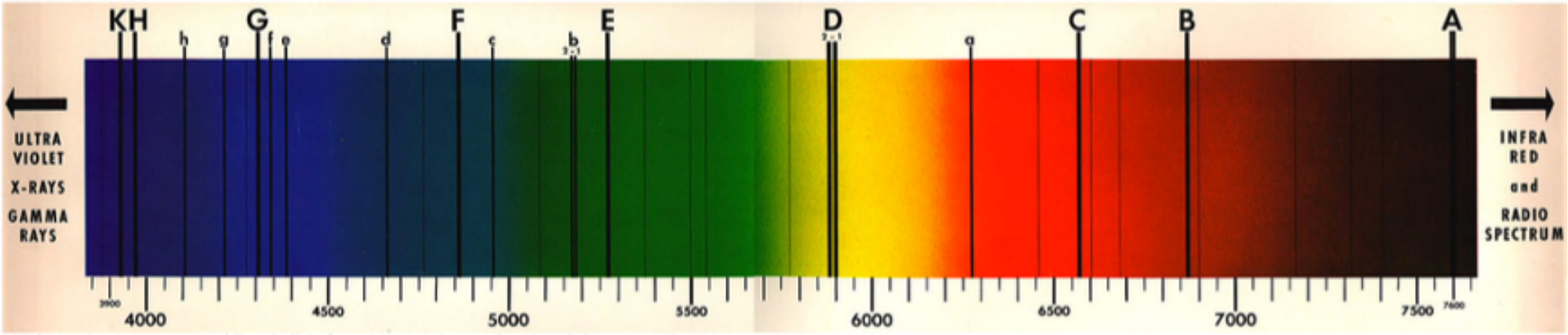
Early spectroscopy



What are the dark bands?

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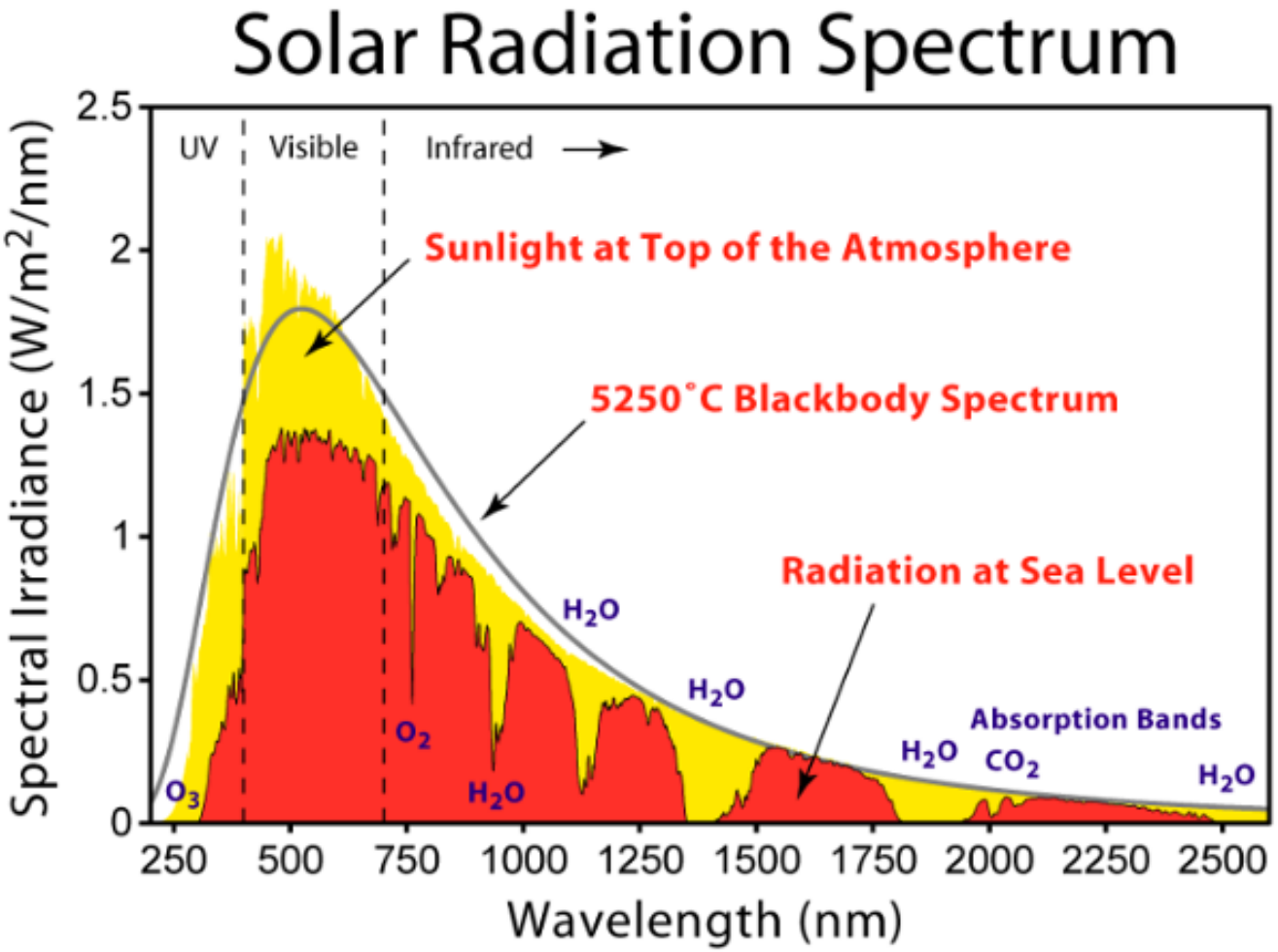
The Solar Spectrum



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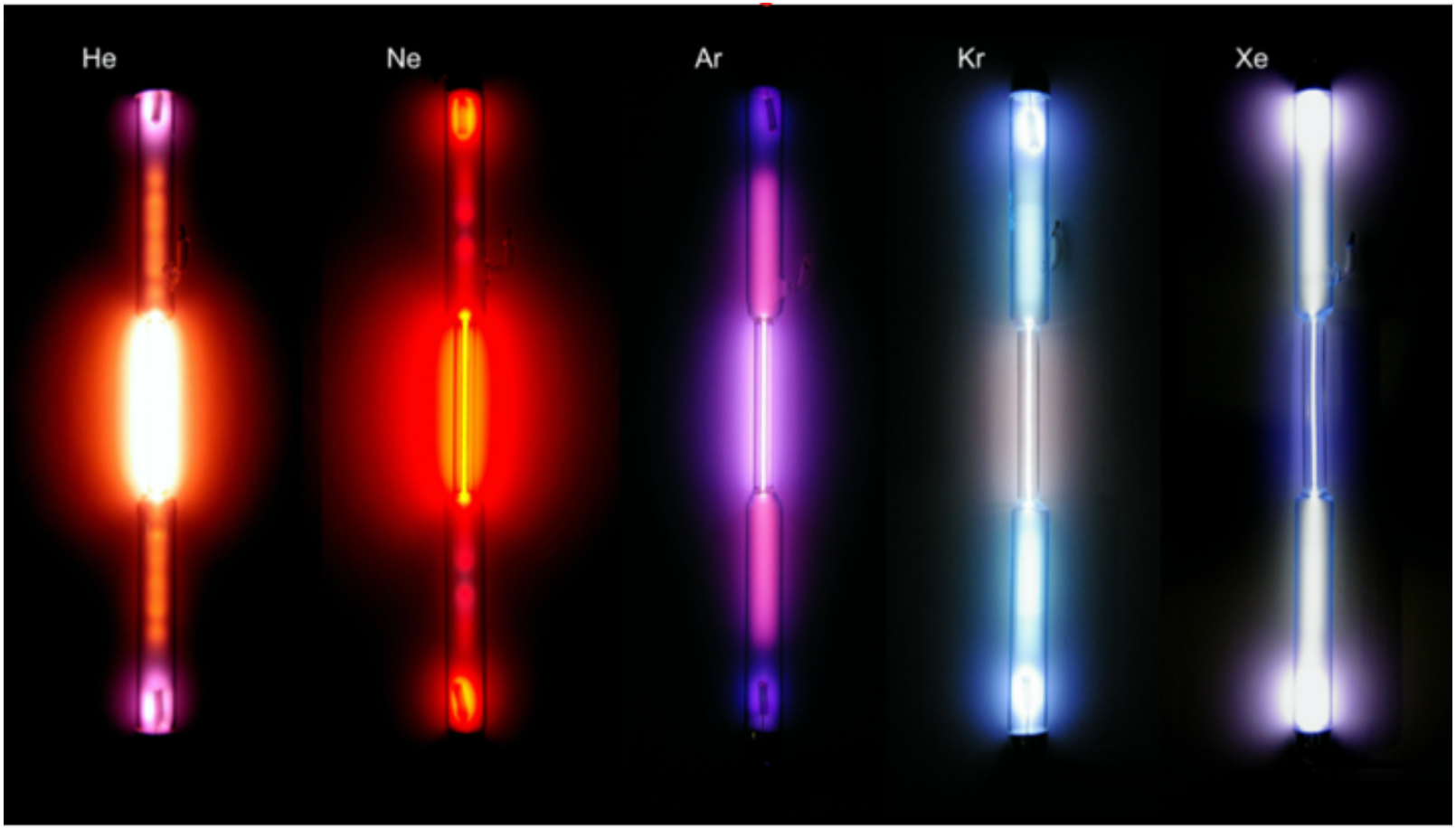
Different gases: different colors



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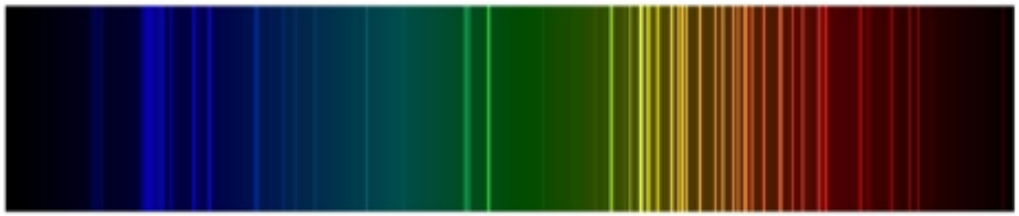
Emission spectra

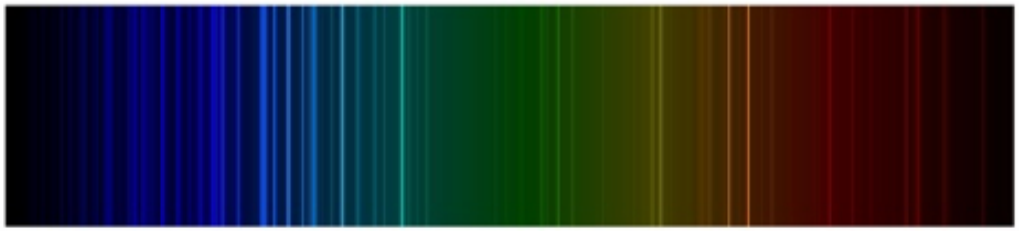
Look at the light emitted from different hot gases through a diffraction grating.

The single colour we see with our naked eyes (e.g. purple for argon) is made of a bunch of different exact wavelengths

- Neon



- Argon



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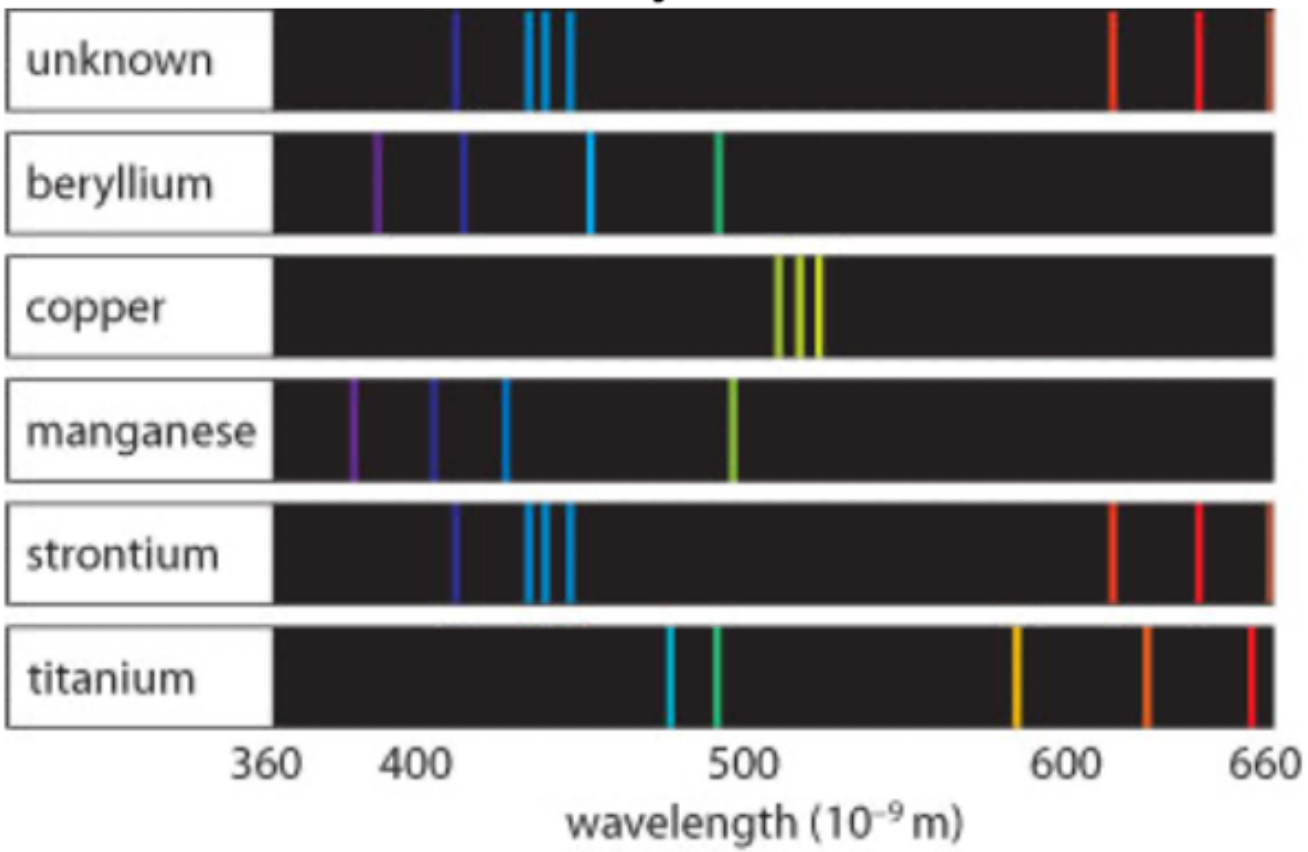
Emission spectra

This is cool because it means every atom has an associated barcode.



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Hydrogen : the Balmer Series (1885)

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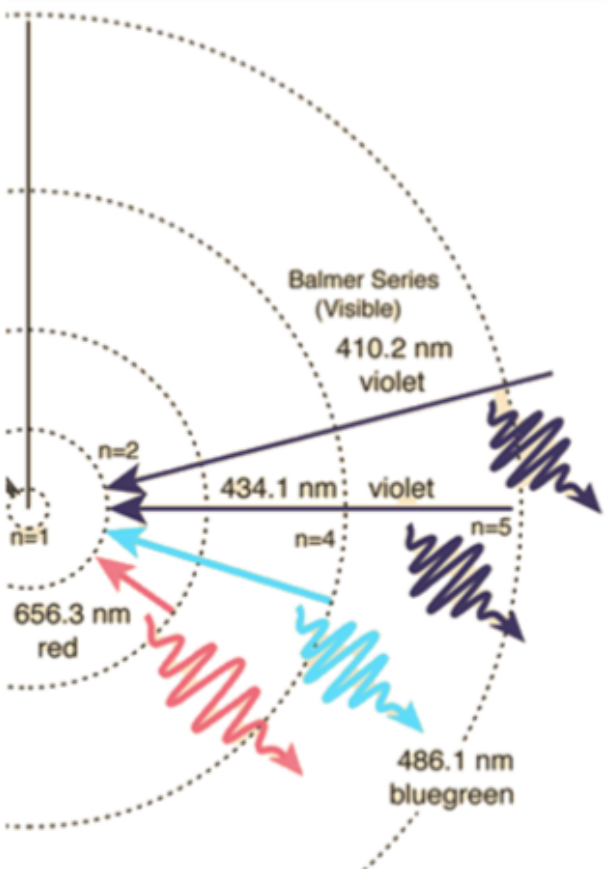
Rydberg's formula (1890)



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Summary

Key formulae:

Balmer's empirical formula:	$\lambda_n = 364.6 \frac{n^2}{n^2-4}$ nm
Rydberg-Ritz formula:	$\frac{1}{\lambda_{mn}} = R\left(\frac{1}{m^2} - \frac{1}{n^2}\right)$ for $n > m$

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