



31189 Stellar Physics/Spectra

(Slide Set Descriptions)

Evolution of Solar Mass Stars

1. Regions of the total electromagnetic spectrum showing wavelength and frequency ranges and opacity of these regions to the atmosphere.
2. Relationship of wavelength and frequency and comparison of violet waves to red waves.
3. A photograph of the visible spectrum with wavelengths in Angstroms
a n d
microns noted.
4. Chart illustrating Stefan-Boltzmann Law showing that total energy
r a d i a t i n g f o r m
a black body varies as the fourth power of the temperature.
5. Planck curve for the sun showing the distribution of energy in the
infrared, visible and ultraviolet regions of the spectrum.
6. Comparative Planck energy distribution curves for several black bod-
ies (stars) ranging in temperature from 4000 to 8000 K.
7. Kirchoff's third law of the spectrum illustrated schematically by a
glowing low pressure gas producing an emission spectrum.
8. Kirchoff's third law of the spectrum illustrated schematically by
light from a star being partially absorbed while passing through a
region of low pressure gas producing absorption lines in the continu-
ous spectrum of the star.
9. Schematic representation of the hydrogen atom showing its electron
and proton and the orbital radii of several electron shells.

10. Schematic representation of the helium atom in the neutral, excited, and ionized states.
11. The Bohr hydrogen atom showing the electronic transitions that can take place in the various energy levels of the hydrogen atom.
12. The energy level diagram of hydrogen showing the electronic transitions that take place in the Lyman, Balmer, Paschen, and Brackett series.
13. A schematic representation of the Balmer series of hydrogen showing the converging hydrogen absorption lines from H-alpha through H-epsilon and seen against a continuous spectrum



14. Henry Draper's spectral classification denoting the basic spectral characteristics, colors and temperatures of stars of type O, B, A, F, G, K, M, R, N, and S.
15. Color photograph of the comparative spectra of 7 stars from spectral type O to type M.
16. Schematic diagram showing the effect of increasing and decreasing temperature on the strength of the hydrogen lines in the B Series.
17. Diagram illustrating the relative strengths of helium, hydrogen, and the metals in states of excitation and ionization in the 7 spectral types of stars.
18. Graph showing how the percentage of calcium atoms in the neutral, singly, and doubly-ionized states change as the temperature increases.
19. Schematic diagram illustrating electrons spiraling along magnetic lines of force and emitting synchrotron radiation.
20. Chart comparing three temperature scales: Fahrenheit, Celsius and Kelvin. Also compared stellar surface temperatures in Fahrenheit and Kelvin.
21. Schematic diagram showing the entire range of temperatures found in the universe. Astronomical and terrestrial examples given from the Big Bang fireball to the 3K relic background temperature of today.
22. Schematic diagram illustrating James Maxwell's concept of light traveling in wave motion and composed of both electric and magnetic fields at right angles to each other.
23. Schematic diagram showing the mechanism responsible for 21 cm radio emission from neutral hydrogen.



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