position or wavelength of lines could alter. If a star or other radiating source was moving towards the observer he saw a shift of lines towards the blue end of the spectrum, and if it were moving away, a shift to the red or *redshift*. The amount of this shift was a measure of the **radial velocity** or speed of approach or recession. Moreover, as stars never show any change of size due to such radial motion, even in a telescope, this *Doppler shift* has proved to be the only way to detect such motion (Mathematically, if λ_0 is the normal (rest) wavelength, and $\delta\lambda$ a small change due to radial motion, then if c is the velocity of light and v the velocity of the source, $v = c\delta\lambda/\lambda_0$.)

Temperature

As science advanced, especially in the realms of atomic physics, more was understood about the interpretation of stellar spectra. It was known from studies of the Sun that the continuous part of the spectrum came from an opaque region of the stellar atmosphere known as the surface layer. This layer is not solid but gaseous and as the height in the atmosphere increases the temperature falls. The absorption lines come from those cooler regions and so one can obtain a surface temperature or an atmospheric temperature. In order to compare different stars a common term having a precise definition must be employed. This is the **effective temperature** (T_{eff}) and is defined to be the temperature of a black body whose total luminosity is the same as that of the star in question. A black body, an object which is both a perfect emitter and absorber of radiation, is a familiar concept to physicists. The effective temperature is therefore a physically meaningful parameter if it can be accurately measured. This is particularly important for the hottest stars which emit the bulk of their power at ultraviolet wavelengths, which cannot penetrate the Earth's atmosphere. However, for the majority of stars T_{eff} can be well determined and lies on the KELVIN TEMPERATURE SCALE between 3 000 K and 40 000 K.

At these high temperatures many atoms will be stripped of one or more of their ELECTRONS (**ionized**), the degree of ionization depending on the temperature and the density in the stellar atmosphere. At higher temperatures greater ionization will occur but as the density increases it becomes easier for an ionized atom to recapture an electron. Therefore, as stellar atmospheres become more dense ionization is inhibited. The degree of ionization in a stellar atmosphere is a key parameter in the appearance of a spectrum.

Because there is a large range of effective temperatures for stars and as this determines the degree of ionization of the elements and thus the appearance of the spectrum, we should expect to find a wide variety of stellar spectra. This is, in fact, the case and the range is even larger when one considers stars whose chemical composition is very different from the majority of stars known as normal stars. The Sun is an example of a normal star.

To bring order to the multitude of observed spectra, a classification scheme was devised, principally by Harvard College Observatory during the early years of this century. This culminated in the

A low dispersion spectrum of the Hyades star cluster obtained with a device known as an objective prism: a large prism placed at the front aperture of the telescope thus enabling the spectrum of each star to be obtained simultaneously.