Chapter 19. Stellar Observations: Positions, Magnitudes, and Spectra

Note. In this section we introduce some properties of stars and how these properties are detected

Note. *Astrometry* is the science of measuring star positions. The gradual change in a star's position is called its *proper motion*.

Note. The distance to nearby (within 300 light years) stars can be measured directly using *stellar parallax*. A star with a parallax of 1 arcsecond would be at 1 *parsec* (3.26 light years).

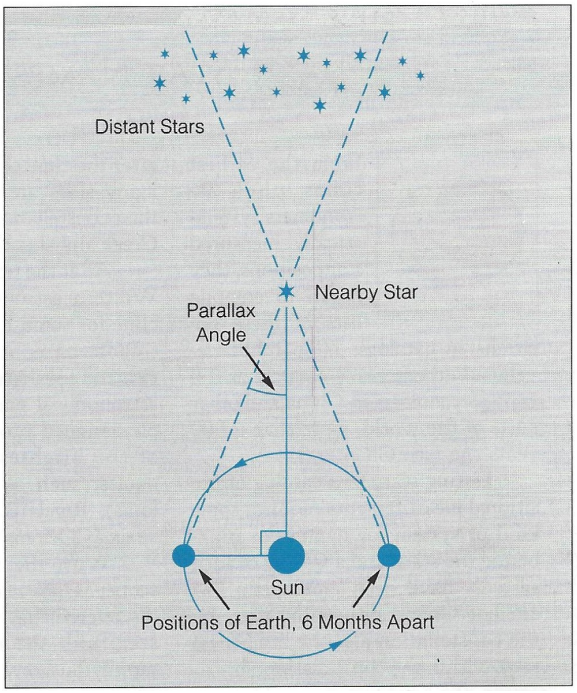

Figure 19.3. Stellar parallax.

Note. Hipparchus introduced the idea of a *magnitude* scale for star brightness. Stars that differ by one magnitude differ in brightness by $(100^{1/5} \approx 2.512$. The *bolometric magnitude* includes all wavelength light measured from a star.

Note. Stars were arranged in *spectral classes* depending on the types of spectra. They are arranges as O, B, A, F, G, K, M/ The spectral type corresponds to surface temperature with O as the hottest and M as the coolest.

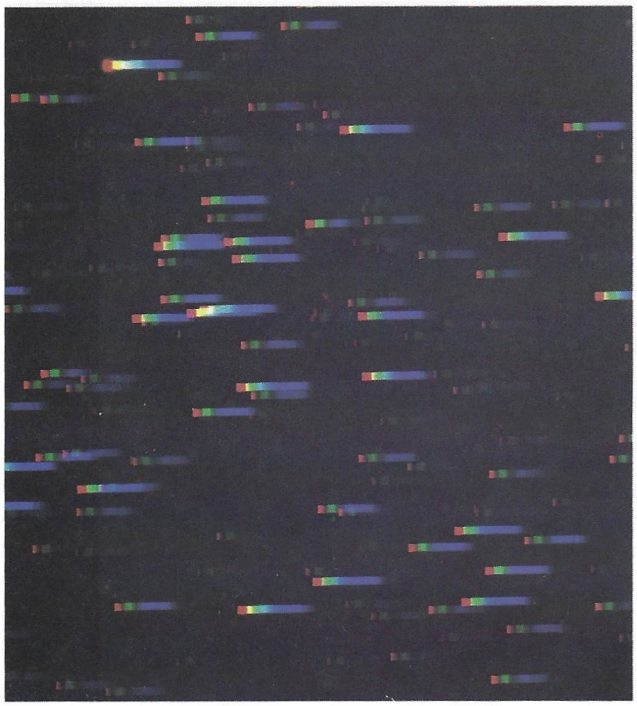

Figure 19.8. Stellar spectra.

Note. Double (or *binary*) stars can be classified as:

1. *optical doubles* which appear close together in the sky but which are not physically linked,

2. *visual binaries* for which measurements reveal motion about each other,

3. *astrometric binaries* which are detected by wobbles in their positions,

4. *eclipsing binaries* which are stars that alternately pass in front of each other causing variations in apparent magnitude,

5. *spectrum binary* which is revealed by the presence of two spectral types, and

6. *spectroscopic binaries* which are revealed by a doppler shift that indicates the orbit of the stars around each other.

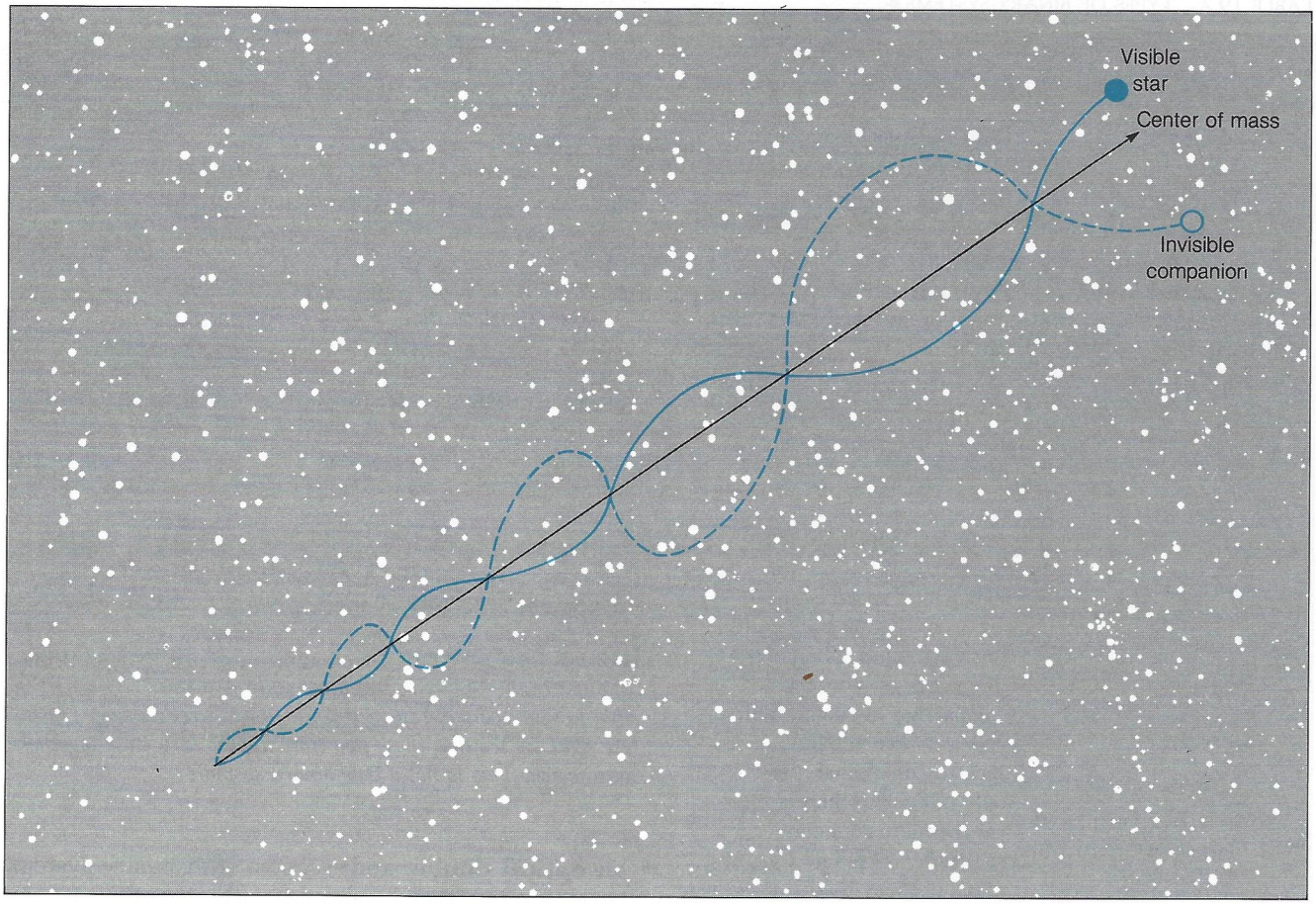

Figure 19.16. An astrometric binary.

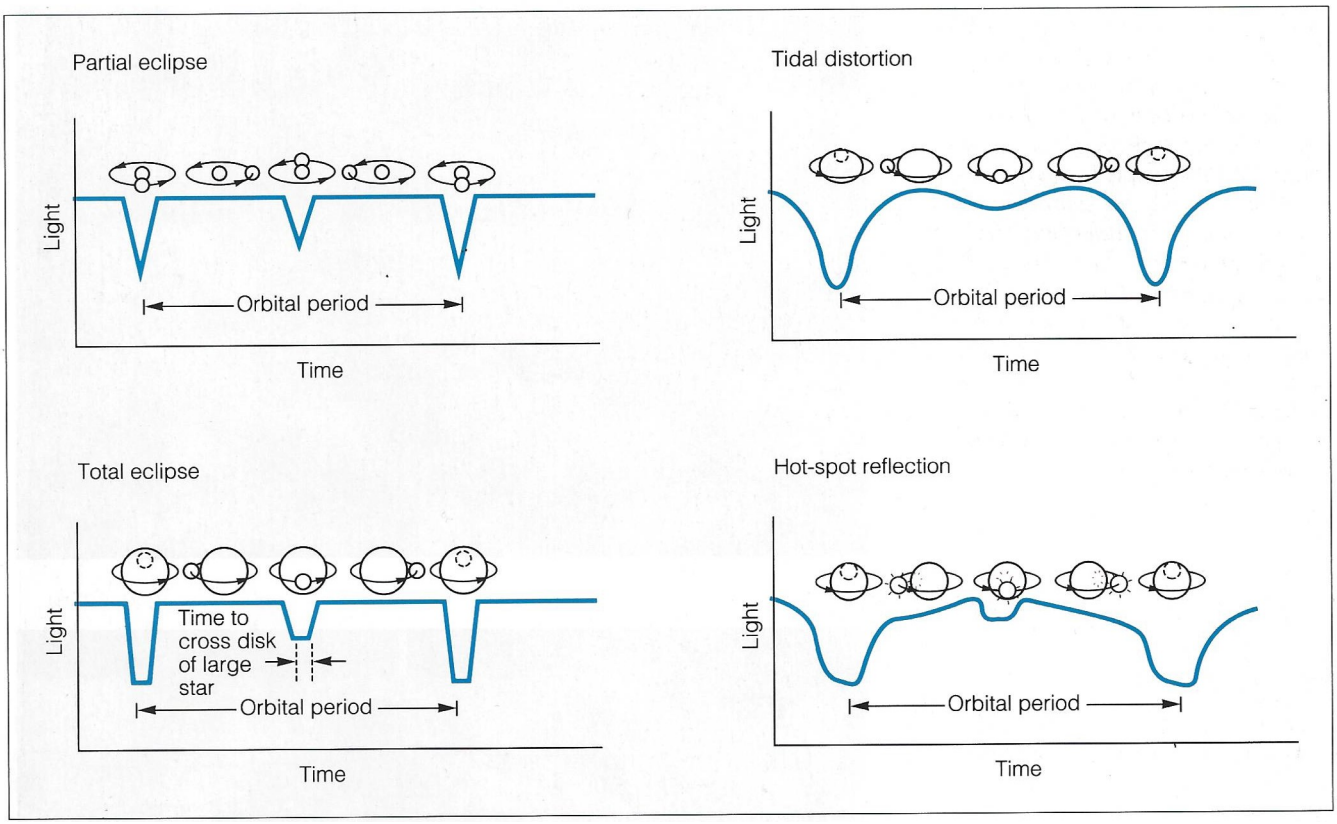

Figure 19.17. Eclipsing binaries and their light curves.

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