

Table 3.5 Classes of unusual stars

Class	Defining characteristic	Remarks
Cepheids	Massive, luminous, variable stars with characteristic asymmetric light curves, periods 1–10 days and F-type spectra.	Sometimes called δ Cepheids or classical cepheids to distinguish them from W Virginis stars (see below). Their periods, luminosities and colors satisfy a period-luminosity-color relationship that plays an important rôle in determining the cosmic distance scale see §§5.1.10 and 7.3.1. Their initial masses exceed $\sim 5 M_{\odot}$ and their ages are $\lesssim 0.1$ Gyr.
Miras	Very red variable stars with periods 80–1000d and amplitudes up to 7 mag. Most show emission lines.	Stars near their deaths. Satisfy period–luminosity relation; typical $M_{\text{bol}} = -5$. Frequently surrounded by shells of gas detectable in the infrared and through mm emission by CO.
OH/IR stars	Stars with strong line emission at 1612MHz from masing OH radicals. Also luminous mid-infrared emitters.	Luminous end of population of Miras. OH/IR emission comes from gas that has been ejected by the star. The ejection velocity of the gas can be measured and used to estimate the age of the star.
RR Lyrae	Variable stars with characteristic asymmetric light curves showing periods $\lesssim 1$ d, peak luminosity $M_V \sim 0$ and A-type spectra.	Stars of roughly solar mass. Occur in globular clusters and in other low-metallicity systems.
T-Tauri stars	Irregular variable stars with Balmer lines and Ca HK in emission. Frequently show Li I absorption. Spectral types F–M.	Pre-main-sequence stars (§5.1.8), perhaps with accretion disks.
Wolf-Rayet stars	Luminous O or B stars showing strong broad emission lines with P-Cygni profiles (Figure 3.4). Also lines of highly-ionized species.	Usually very massive, short-lived stars. WN stars show strong emission in lines of nitrogen, while carbon lines are prominent in the spectra of WC stars.