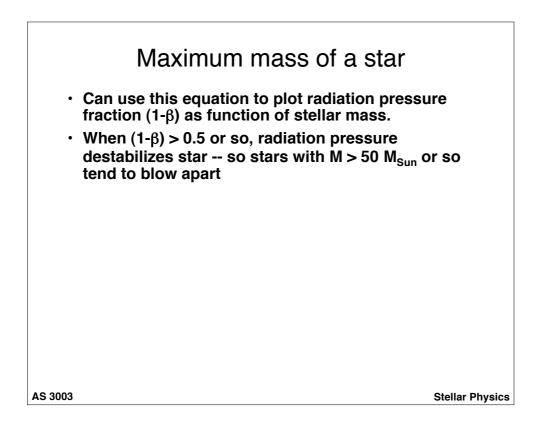
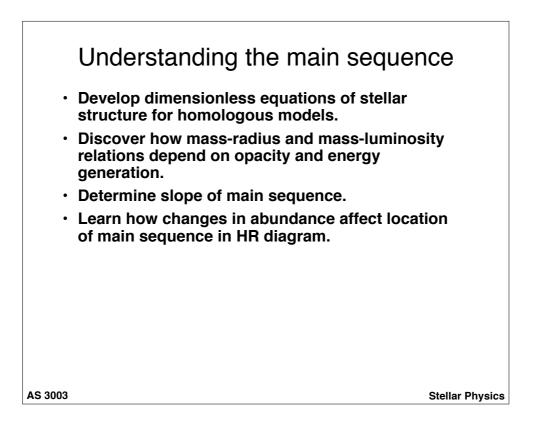
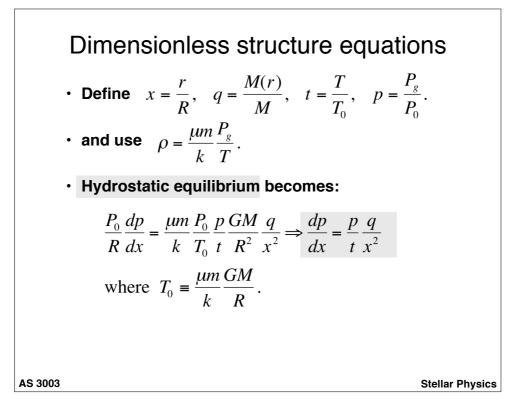


Badiation pressure in stellar core $P_{c} = P_{gas} + P_{rad}$, more conveniently written in terms of a parameter β : $P_{gas} = \beta P_{c} = \frac{\rho_{c}}{\overline{m}} k T_{c}$ and $P_{rad} = (1 - \beta) P_{c} = \frac{1}{3} a T_{c}^{4}$. Use β to eliminate T_{c} : $P_{c} = \left[\frac{3}{a}\frac{(1 - \beta)}{\beta^{4}}\right]^{1/3} \left[\frac{k\rho_{c}}{\overline{m}}\right]^{4/3}$. Equate this to hydrostatic equilibrium pressure : $\left[\frac{\pi}{36}\right]^{1/3} G M^{2/3} = \left[\frac{3}{a}\frac{(1 - \beta)}{\beta^{4}}\right]^{1/3} \left[\frac{k\rho_{c}}{\overline{m}}\right]^{4/3}$.







$$\begin{aligned} \text{Mass continuity} + \text{energy transport} \\ \cdot \text{ Similarly:} \qquad & \frac{M}{R} \frac{dq}{dx} = 4\pi R^2 x^2 \frac{\mu m}{k} \frac{P_0}{T_0} \frac{p}{t} \Rightarrow \frac{dq}{dx} = x^2 \frac{p}{t} \\ & \text{where } P_0 = \frac{GM^2}{4\pi R^4} \\ \cdot \text{ Transport: Let } \kappa = \kappa_0 \rho^{\alpha} T^{-\beta} = \kappa_0 \left(\frac{\mu m}{k} \frac{P_0 p}{T_0 t}\right)^{\alpha} (T_0 t)^{-\beta} \\ & \frac{T_0}{R} \frac{dt}{dx} = -\frac{3\kappa_0}{16\pi a c (T_0 t)^3} \left(\frac{\mu m}{k} \frac{P_0 p}{T_0 t}\right)^{1+\alpha} (T_0 t)^{-\beta} \frac{Lf}{R^2 x^2} \\ & \Rightarrow \frac{dt}{dx} = -C \frac{p^{1+\alpha}}{t^{4+\alpha+\beta}} \frac{f}{x^2} \end{aligned} \text{ where } C = \frac{3\kappa_0}{16\pi a c} \left(\frac{\mu m}{k}\right)^{1+\alpha} \frac{P_0^{1+\alpha}}{T_0^{5+\alpha+\beta}} \frac{L}{R} \\ \text{AS 303} \end{aligned}$$

