

4 Application: Stellar Winds

Let $T(\vec{r}, t) = T_0 = 10^6 K$. Consider a static system, ($\frac{\partial}{\partial t} = 0$, with spherical symmetry, ($\frac{\partial}{\partial \phi}, \frac{\partial}{\partial \theta} = 0$). The only force acting on the system then, is gravity, and it only acts in the \hat{r} direction. Thus, our Newton's second law equation is:

$$\vec{F} = (\vec{F} \cdot \vec{r})\hat{r} = -\nabla P - \frac{gM_o\rho}{|r - r'|^2} \quad (11)$$

Assignment: Given this equation, we'd like to solve for the density ρ as a function of \vec{r} .