Some numbers: $L_{\odot} = 4 \times 10^{33}$ ergs/second $M_{\odot} = 2 \times 10^{33} \text{ grams}$ $c = 3 \times 10^{10}$ cm/second. $E = mc^2$ Stephan's Law: $F = \text{Luminosity/area} = \sigma T^4$ $\sigma = 6 \times 10^{-5} \text{erg} \cdot \text{cm}^{-2} s^{-1} K^{-4}$ $L = F \phi(\text{surface area})$ Surface area of a sphere of radius $r = 4 \times \pi \times r^2$ $E = L \cdot \tau$

1. Label each of the following statements about the solar wind true or false.

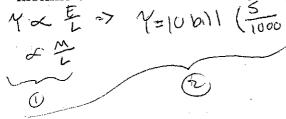
Hydrostatic equilibrium is the balance between electrical repulsion and gravity.

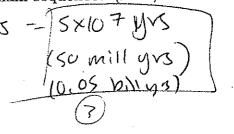
The Earth's surface is protected from the solar wind by the Earth's magnetic field 2

The solar wind is made mostly of neutrinos

\(\) Most or all stars form in groups or clusters of stars.

2. How long will a $5M_{\odot}$ star with $L=1000L_{\odot}$ spend on the main-sequence? (Hint, the main-sequence lifetime of the Sun is 10 billion years). $Y \propto \frac{E}{2} \Rightarrow V = |Ubil| \left(\frac{5}{1000}\right) = |x|09.0, \cos 5 = -\frac{5}{5} \times 10^{7} \text{ MVS}$





3. You are given that a star has a (surface) temperature of 5000 K and a radius of 7×10^{10} cm.

(a) What is the surface area of the star?

hat is the surface area of the star:
$$5A = 444 (7 \times 10^{10} \text{ cm})^2 = [6.1575 \times 10^{22} \text{ cm}^2]$$

(b) Find the energy per area at the surface of the star?

(c) Find the luminosity of this star using your relation for the energy/area from (b) and the surface area in (a).