GEO 2303
February 19, 2008
Due: February 27, 2008

PROBLEM SET #4

1. What are the primary energy producing reactions in the Sun?

2. Does the presence of Fraunhofer lines indicate a first or second generation star? Why?

3. How will our Sun evolve over time? Provide reactions and approximate time scales.

4. What is the frequency of light with a wavelength of 440 nm? ($c=3.0 \times 10^8$ m/s)

5. How does carbon act as catalyst in the hydrogen fusion reactions of second generation stars?

6. Why are the cosmic abundances of Li, B, and Be in the Cosmic Abundance Curve (p.16) so low compared to their neighbors up to Fe?

7. Could the CNO cycle operate in a sufficiently massive first generation star?

8. In a magnetic sector mass spectrometer, would the measured mass increase or decrease if you:
   1). Increase the accelerating potential
   2). Decrease the magnetic field

9. You are measuring ^{85}Sr, ^{86}Sr, ^{87}Sr, and ^{88}Sr. What is the radius of the path of ^{85}Sr and ^{87}Sr with a magnetic field of 8000 Gauss (10000 Gauss = 1 Tesla) and an accelerating potential of 10000 V? Do the lighter elements fall on the inside of the path or the outside path? (Simply assume: atomic mass equals mass number.)